YES OR NO

WHAT YOU NEED TO KNOW ABOUT AUTOMATION: A DECISION SYSTEM FOR ONTARIO LIBRARIES.

Libraries and Community Information Branch
Ministry of Citizenship and Culture
May 1984

The Ontario Ministry of Citizenship and Culture

This manual is one of the final efforts of the Network Development Office of the Libraries and Community Information Branch. The N.D.O. as it was commonly referred to provided the Ministry with consultative assistance for special library projects, including the Ontario Public Library Programme Review.

As a consequence of the recommendations in the Review and the various task groups relating to technical services, the functions of the N.D.O. have been internalized by Branch. A Technical Services Unit has now been created which will provide leadership province-wide in the technical area.

David Hall and Rosemary Smith comprised the N.D.O. and were together responsible for this publication. We would also acknowledge the assistance of the Ministry of Municipal Affairs and Housing for advice in the preparation of this manual.

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FOREWORD

Advances in computer and information technology continue to have a powerful impact on the development of library automation and networking. Changes in technology will bring the cost of sophisticated automated systems within the budget range of most libraries, not just the larger institutions. In addition progress is being made in providing links between computer systems with differing hardware and software components. This development will better enable libraries to access and share bibliographic and other data.

From the provincial view new developments in library automation and telecommunications capabilities make a province-wide decentralized cooperative information network a possibility. For the individual library the total integrated system capable of handling most library operations will likely become a reality in the near future. Given the explosion of information, however, the need to be linked to and to share in bibliographic resources becomes especially critical. In the future no system will really "stand alone".

The publication of this library automation "primer" is designed to provide assistance to libraries in the automation process. It is hoped that practical information on how to proceed with a library automation project, from initial consideration of a library's needs to the actual implementation of an automated system will be of assistance to those library administrators and boards contemplating this important step.

Bernard Ostry
Deputy Minister

TABLE OF CONTENTS

		PAGE
0.	**Overview**	1
1.	**Initial Steps**	4
1.1	Pressures to Automate	4
1.2	The Basic Needs Assessment	5
1.3	Getting Background	7
1.4	Making a Preliminary Decision	8
2.	**The Feasibility Study**	9
2.1	Management	9
2.1.1	Providing Definition	9
2.1.2	Administering the Process	13
2.2	Defining Automation Benefits	14
2.2.1	Tangible Benefits	14
2.2.2	Intangible Benefits	20
2.3	Defining Automation Requirements and Costs	22
2.3.1	Requirements	22
2.3.2	Costs	29
2.4	The Cost-Benefit Analysis	31
2.5	Decision-Making	34
3.	**Selection and Purchase**	36
3.1	Management	36
3.2	Selecting the System	37
3.2.1	Preparation of the Request for Proposal	38
3.2.2	Preparation of Evaluation Methodology	47
3.2.3	Issue of Requests for Proposal and Receipt of Proposals	51
3.2.4	Evaluation of Proposals and Selection of Vendor	52
3.3	Decision Making	52
3.4	Contract Negotiations	52
3.4.1	Negotiation	53
3.4.2	Terms of the Contract	53

PAGE

4. Implementation 60

4.1 Management 60

4.2 Implementing the System 61

4.2.1 Site Preparation 61
4.2.2 Communication Line Installation 62
4.2.3 Development of Policy Parameters 63
4.2.4 Systems Acceptance Testing 63
4.2.5 Data Conversion 65
4.2.6 Staff Training 66
4.2.7 Public Relations 67

4.3 Post-Implementation Review 67

Appendix: Sources For Assistance For Ontario Public Libraries

LIST OF FIGURES

		PAGE
Figure 1:	Middleville Public Library - Manual System Data Collection Form - Reserves	17
Figure 2:	Middleville Public Library - Staffing Cost Displacement - Reserves	19
Figure 3:	Middleville Public Library - Profile	24
Figure 4:	Middleville Public Library - Request for Information - Reserves	25
Figure 5:	Middleville Public Library - Ten Year Cost and Benefit Projection	33
Figure 6:	Middleville Public Library - Request for Proposal - Reserves	42

OVERVIEW

0. OVERVIEW

This guide has been developed to assist Ontario Public Libraries with library automation. It provides library management with a framework and process within which to move in a logical manner in this endeavour. The framework as described is divided into four major components. The library moves through each of these stages, from initial consideration of library automation needs, through a feasibility study, through the selection and purchase of an automated system, to the implementation and operation of that system. The process does not presume that once a library embarks on an automation study, implementation of an automated system will be the end result. The framework itself provides certain check-points where the library can decide if it will proceed further towards automation or stop. The reader should note that this guide is intended as an introduction to the automation process. A minimum of technical language has been used.

Each of the four chapters in this guide presents a different stage in the automation process.

In **CHAPTER ONE - INITIAL STEPS,** the library examines its present operations for the purpose of determining whether automation meets any of the demonstrated needs of the organization and whether an in-depth study of library automation should be undertaken. This is a three part process. A basic needs assessment takes place where those parts of the library operation, if any, which might benefit from automation are isolated. Information is then gathered on automated systems as they relate to the specific needs of the library. Finally a decision is made as to whether to proceed further in the automation process. A decision in the affirmative is likely if there is a close correlation between the demonstrated needs of the organization and an automated solution to those needs. The above preliminary investigation of library automation requires minimal expenditure of staff time and effort.

In **CHAPTER TWO - THE FEASIBILITY STUDY,** the library performs an in-depth study of automation in relation to its needs. The purpose of this formal exercise is to determine the viability of library automation and to provide information which can be used to make a decision on whether or not to proceed to the selection and purchase of an automated system. The feasibility study is a three part process. The library first determines the benefits which can be achieved through automation. These include potential cost savings which are dollar definable in terms of present library operations as well as future service benefits which are usually not dollar definable. In the second step, the library is concerned with automation requirements and costs. It writes a description of what it wishes an automated system to provide and secures information on automated system capabilities and estimated costs from library automation vendors in the marketplace. Other automation costs not included in the above are also pinpointed. The third step in the process involves the completion of a cost-benefit analysis where the costs of automation are compared with the dollar definable benefits of an automated system. At this stage it is possible to project the break-even point, that is the point in time, in years, when a system will pay for itself after purchase and installation. It is also possible to project return on investment for dollars expended.

The results of the feasibility study are presented to library management,

the Board and Municipal Council for a decision with regard to proceeding to the next stage in the automation process: the selection and purchase of a system. A decision to proceed may be made on a combination of factors such as the availability of systems to meet the library's needs, a positive cost benefit analysis when automation costs are compared to potential cost savings and the availability to the library of future enhanced service levels through the use of automation. A library should not proceed to the next stage in the automation process without first receiving agreement in principle from its municipality to fund the automation project.

In **CHAPTER THREE - SELECTION AND PURCHASE**, the library proceeds to select an automated system. After receiving approval from governing and funding authorities for its choice, it then enters into contract negotiations with a selected vendor. As was the case in the feasibility study, selection and purchase is a formal process requiring a number of steps and the expenditure of considerable time and effort.

The key instrument in selection is the library's Request For Proposal (RFP) which is a structured document to obtain information from vendors who wish to provide the library with an automated system. This document contains the library's detailed requirements for an automated system and asks vendors to indicate whether their systems can comply with these requirements. It requests that vendors propose a system configuration (hardware and software) to meet the library's needs and to provide firm costs for the purchase, installation and maintenance of a system. Unlike prior documents requiring information from vendors in the feasibility study, the RFP indicates that the library has agreement in principle from funding authorities to purchase a system. The RFP and a vendor's response to it are usually considered legal documents and are appended to any contract between a library and a selected vendor.

Before the library receives responses to the RFP it should have in place the evaluation methodology to be used in selection. Criteria for evaluation usually include the costs to purchase, install and operate a system, the system capabilities as proposed to meet the library's requirements and certain vendor considerations such as experience, credibility, financial stability, etc. Each of the criteria can be assigned a relative value or weight as to its importance and from this a scoring methodology can be derived.

Upon receipt of proposals the library will evaluate the actual proposal documents by using the evaluation criteria and the scoring methodology. With respect to system capabilities and vendor considerations the library will also evaluate information against site visits where a vendor's system is operating as well as reference checks. From the evaluation the library will rank vendors as to first choice, second choice, third choice, etc.

Before proceeding with contract negotiations, the library will present its recommendation for selection, along with all supporting documentation, for approval by its governing and funding authorities. At this point the cost-benefit analysis as prepared in the feasibility study should be updated with the actual costs as associated with the selected system.

After receiving approval the library will enter contract negotiations with the selected vendor. Successful negotiation involves flexibility by both parties. There may be changes to system capabilities as originally

requested by the library and there likely will be changes to equipment as proposed by the vendor with resultant impact on costs. As part of negotiations the library and vendor will be concerned with such things as an implementation plan, payment schedules for vendor equipment and services, acceptance tests for the system and penalty and termination clauses for non-performance by either party under the terms of the agreement.

In **CHAPTER FOUR - IMPLEMENTATION,** the library proceeds with the practical implementation of the selected automated system. This stage of the automation process requires close liaison between the library and the vendor and in fact the steps and their timing in implementation are governed to a great degree by clauses in the contract. Both parties are concerned that the system be up and running with as few difficulties as possible. The library will be involved in a number of vital tasks during this period. Some of these are performed at only one point in the process while others carry through over a long period of time. Major tasks include: preparation of the physical site for the computer installation, communications line installation from terminal sites to the computer facility, the development of library policy parameters for input to the computer (eg. patron and material categories, loan policies, etc.), system acceptance testing including hardware and software acceptance, and reliability and response time testing, the conversion of data from the manual to the automated system, the training of staff and public relations.

Upon completion of implementation and after the system has operated for a period of time the library should perform a post-implementation review. This serves to identify how well the automation project has met its objectives and, if problems are apparent, to recommend ways for corrective action.

A short **APPENDIX** is included with this guide, which provides a list of sources for assistance for those Ontario public libraries which are considering becoming involved in the automation process.

CHAPTER ONE

INITIAL STEPS

1. INITIAL STEPS

This chapter notes the very real pressures for automation being faced by the library community in the nineteen eighties and proposes certain preliminary steps to deal with these pressures in a logical manner. It suggests that the library engage in a preliminary assessment of needs to isolate any areas in the library operation which might benefit from change and to determine if automation is applicable in these areas. After doing this, library management is in a position to determine whether to proceed with a feasibility study on library automation which may involve a considerable expenditure of dollars with respect to staff and/or consulting time.

1.1 Pressures to Automate

The computer revolution is a fact of life in the nineteen eighties. Although promised since the sixties, automation is really only beginning to have a significant impact on many industries, businesses and institutions and on the personal and work life of the individual. This revolution applies as fully to libraries and library employees as to any other segment of society. Although some vendors were active in the library automation field in the nineteen seventies, and a number of institutions were purchasing or developing their own in-house systems, commercial activity in this area is expanding at an accelerated rate in the nineteen eighties. There are a number of vendors currently active in the marketplace offering products which can be installed and used by libraries. The technology itself is changing in that the future appears to indicate less expensive systems will be available for library applications, thus enabling smaller and smaller institutions to consider automation without incurring prohibitive costs.

A parallel phenomenon to the computer revolution in the nineteen eighties is the hard fact of fiscal restraint. After enjoying a time of economic expansion in the sixties and early seventies when healthy increases in both operating and capital budgets could be expected as a matter of course, libraries are now faced with a situation where budget increases are being kept to a minimum. Libraries are finding it increasingly difficult to operate effectively in these circumstances and their funding authorities are encouraging more efficient and cost-effective operations.

As a result of these two factors, the increasing availability of technology and the decreasing availability of funds, automation is viewed more and more as a potential means of raising service levels and staff productivity in libraries while at the same time containing escalating costs.

Library administrators and their boards can thus expect pressure to automate at least some of their operations in the next decade. This pressure can come from a variety of sources including the following:

- Example -- Other libraries or municipal departments within the community have successfully automated.

- Peer Pressure -- Colleagues and associates have automated portions of their operations and are sharing their expertise with the rest of the library community.

- Automation Hype -- Advertising and marketing of computer technology is widespread and compelling.

- Enthusiasts -- Every institution has its enthusiasts, whether library staff, board members or users; some of these have a widespread knowledge of computer applications.

- Governing and Funding Authorities -- Requests for a library to consider automation for reasons of efficiency and cost-effectiveness and/or to provide better services may come from the powers above.

- Perceived Internal Needs -- Automation may be viewed from within as a potential means of eliminating certain problem areas in the running of the organization and/or providing enhanced service levels to library users.

The above pressures can be positive or negative in nature and can appear singly or in combination, the latter more likely being the case. Faced with this situation, library management would be wise to handle these pressures to automate within a defined and logical framework. An initial step in the process can be to take an overview of your situation for purposes of determining whether automation is appropriate. This overview has both internal and external components and can include the following:

- A basic needs assessment with respect to present library operations.

- A basic understanding of what is available in the library automation marketplace.

At the end of this exercise, you should be in a position to determine whether you proceed further in the automation process or not.

1.2 The Basic Needs Assessment

A preliminary step to consider when faced with the possibility of automation is the preparation of a basic needs assessment. This assessment looks at the total library operation with a view to determining various strengths and weaknesses and isolating problem areas or those areas which could benefit from change. Although this can be done in detail, with a great expenditure of staff time and effort, what is being suggested here is an intellectual exercise on the part of library management to obtain an overview of library operations. In the context of library automation, you are undertaking to pinpoint areas within the library which could benefit from automation. In this process an attempt is being made to separate real needs within the organization from mere wants which can be generated as a result of the pervasive advertising of new technology.

Some steps to consider in a needs assessment are as follows:

- Review the goals and objectives of the library.

- Divide the library operation into its component parts:

- Component parts may differ from library to library depending on size, degree of departmentalization, etc.
- Component parts usually relate to cost centres used for budgeting purposes.
- The library operation is usually most easily divisible initially into public services which directly relate to serving the public and support services which provide the essential back-up to public services. Each of these parts can be sub-divided. For example, circulation and reference are two areas often associated with public services and acquisitions, cataloguing and personnel are areas associated with support services.

- Gather available data for each component under study as to inputs, processes and outputs:
  - Inputs -- includes expenditures usually associated with staffing levels, supplies, service contracts, etc.
  - Processes -- what operations are performed, by whom, and how.
  - Outputs -- includes basic statistical data, as to items purchased, catalogued, processed, circulated, overdues sent, patron requests taken, etc. Also includes any basic satisfaction indicators for both library users and staff in relation to library operations.

- Determine efficiency and effectiveness of each component part from the data gathered.

- Isolate problem areas and/or areas which could benefit from change:
  - Areas where there are presently inefficiencies in work flow, service levels, staff utilization, etc.
  - Areas which could benefit from enhanced levels of service although at the present time are operating adequately.
  - Areas where rapid growth has been experienced or is projected and where alternative methods of operation should be explored.

- Determine if the isolated areas relate to technical aspects of the operation which could be considered for library automation. Symptoms in problem areas which could benefit from the application of technology include the following:
  - Labour intensive procedures where staff time and dollars expended appear to be excessive.
  - Lack of access to information where users or staff simply cannot get to information as required.
  - Poor control over information where complete information is not readily available as it is spread over

multiple files, catalogues, etc.

- Lack of timeliness where information as available is out of date.
- Lack of accuracy where information as available is incorrect, misleading or conflicting.

- Identify specific components of the library operation which exhibit some or all of the above symptoms. These symptoms may be applicable to one or several inter-related areas, such as:
  - Acquisitions, including selection, ordering, receiving, funding accounting and claiming.
  - Cataloguing, including catalogue record creation, catalogue production and maintenance, authorities control, and user and staff access to collections.
  - Circulation control, including user registration, check-out, check-in, reserves and overdues.
  - Other components relating to administrative and financial management such as accounting, budget control and analysis, etc.

  If problems appear to relate to areas which could possibly benefit from automation, you may wish to proceed to study whether automation can really provide a solution to your needs.

  Note that a number of defined problem areas or concerns may have nothing to do with technology, being related instead to such things as deficiencies in physical plant, funding levels, policies, etc.

1.3 Getting Background

Prior to performing a basic needs assessment as outlined in the previous section, library management will probably have been exposed to library automation in some form. You may have read general articles on the subject or talked to some of your professional colleagues. Now that you have intially isolated those parts of your own organization which might benefit from automation, you are in a position to gather automation information which is specific to your needs. There are many ways to achieve this:

- Read the professional literature on the applications in which you are interested. There is a great amount of literature now available on library automation.
- Attend automation seminars which are held in conjunction with library conferences or are sponsored by various library associations and professional schools.
- Talk to colleagues who have had practical experience with library automation.
- Visit libraries that have installed systems which may meet your

needs and/or attend demonstrations at conferences, seminars, etc.

The above activities will be on-going throughout the whole automation process should you decide to proceed further than an initial investigation.

1.4 Making a Preliminary Decision

After initial investigation of your internal needs, and determining the availability of automation applications to meet those needs, library management is in a position to make a decision as to whether to proceed further towards automation. If there is a close correlation between demonstrated needs and an automated solution to those needs, an affirmative decision is probably appropriate. This does not mean that automation is the preferable or indeed the only solution to the needs of your organization. Further steps in the process may indicate that alternatives other than automation may be more appropriate. What has been established to this point is simply that automation may be of positive benefit to your library.

A decision at this stage in the process is appropriate, since the next step, the feasibility study, may result in considerable expenditure of dollars vis a vis staff and/or consulting time. The feasibility study requires detailed analysis of internal operations as to methods and costs as well as the gathering of extensive data with regard to automated system capabilities and automated system costs.

CHAPTER TWO

THE FEASIBILITY STUDY

2. THE FEASIBILITY STUDY

This chapter outlines the second phase in the automation process, the feasibility study. This is a formal exercise, the purpose of which is to determine the viability of automation for your library, either for one application, as for example, cataloguing, or for an integrated approach involving several library applications. The library is determining the following:

- Benefits to be achieved through the introduction of automation:
  - Potential cost savings which are dollar definable.
  - Increased service benefits which are not dollar definable.
- Automation requirements and costs:
  - Description of what the automated system will be required to do.
  - Availability of systems in the marketplace and their ability to meet your library's requirements.
  - Costs to purchase, install and operate a system.
- Cost-benefit analysis:
  - Costs of automating in relation to potential cost savings.

At the end of this process, library management, the board and funding authorities will be in a position to determine whether or not to proceed with the selection and purchase of an automated system.

2.1 Management

Having made the decision to perform a feasibility study to determine if automation is a viable option for your library, some attention must be given to the management of the process, since considerable time and energy will be expended in doing all the necessary data collection, analysis and evaluation. The feasibility study can be expensive in terms of dollars expended in relation to the use of library in-house staff or in consultants as purchased from the outside.

2.1.1 Providing Definition

The first major management consideration is to provide definition as to the scope of the feasibility study. One area to be addressed relates to precisely what is being considered for automation. The basic needs assessment has already pinpointed components of the library operation which could benefit from automation. At this point you are further refining what you want to study in terms of automation.

- You are prioritizing your needs in terms of what you want automated. For example, circulation control may be a first priority and serials control of lesser importance.

- You are reducing the scope of the feasibility study to manageable proportions.

At this point you may decide to study one application such as circulation control, or you may decide to explore the possibilities of an integrated system comprising several inter-related applications.

A second area which you will be required to address is the basic nature of the automation project. Will you be looking at your own system installed on your own premises or at some form of shared venture? Some of the possible options are as follows:

- A stand-alone system installed on your library premises.

- A shared system for your library and other municipal departments installed on municipal equipment.

- A cooperative venture between your library and other library jurisdictions involving a stand-alone system installed at one of the libraries.

Prior to discussing these options, two points should be mentioned. The first is whether the library should undertake development of a system or purchase a so-called turn-key system. In the nineteen seventies, a number of libraries undertook their own in-house development with varying degress of success. A number of these systems are now available in the marketplace as turn-key systems where a vendor undertakes to supply not only hardware and software, but also on-going maintenance and enhancement. The small to medium sized library, given the availability of these products, should not consider in-house development as an alternative.

The second point concerns the purchase of computer services through a service bureau which provides certain applications such as cataloguing, database building, serials control, etc. The library may wish to use these services in addition to pursuing in-house automation, or may use them as a first step in automation. In any case, some form of feasibility study is recommended with respect to the purchase of these services since benefits, requirements and costs must be determined.

Positive aspects, as well as major concerns can be listed for each of the three major options -- the individual stand-alone system, the shared library/municipal system and the co-operative venture between libraries.

The Individual Stand-Alone System:

Positive Aspects:

- The library would have complete control of the system and be able to implement its requirements without concern for the requirements of a number of other jurisdictions.

- The library would be able to proceed within its own timeframe for project implementation without being concerned with the

staging necessary if involved with other authorities.

- There would be a relatively simple decision-making process through the library board and Council without requirements to remain in step with other parties and jurisdictions.

- There would be a clear funding and contracting process between the library and the automation vendors.

Concerns:

- All costs would be assumed by the library rather than shared with a number of parties. There could be extensive costs for hardware, software, database building, project management, etc., with an individual project.

- There could be the need for specialized staff expertise for the short term which the library would have to bear all the costs of purchasing.

- A cost benefit analysis could indicate an excessively long period before the system pays for itself in terms of dollar definable benefits vis a vis system costs. In a joint system purchase with the municipality or another library, this break-even point could be more attractive.

The Shared Library/Municipal System:

Positive Aspects:

- If the municipality has or is willing to purchase computer hardware for which library software is available, there may be considerable cost savings for the library in this approach. This presumes a computer on municipal premises large enough to handle both library and municipal requirements with costs shared by both parties.

- If the municipality has computer expertise available, the library would have access to this, should there be problems in implementing the system.

- There could be advantages to the library vis a vis the decision-making and funding process if there is a combined approach from all municipal departments.

Concerns:

- Municipal data processing people would be required to understand the library's data processing needs in depth and become familiar with a different set of technical applications. This could require significant municipal data processing staff time. Library data processing needs are complex and applications deal with complex bibliographic databases, etc.

- There may be problems with the allocation of municipal computer and staff resources to implement the project. The

library's priorities could be tag ends to general municipal priorities.

- Library boards are autonomous bodies within the municipality. There could be a question as to who owns and controls the computer equipment. The municipality may own the computer and the library, the terminals and applications software.

- There could be problems with project management. For example, if the municipality is responsible for this activity, does it have sufficient staff resources to provide the necessary support for the implementation of the library system?

- The municipal computer could be of a model and make for which no library software is available. It is expensive and time consuming to develop software in-house.

The Cooperative Venture Between Libraries:

Positive Aspects:

- There could be considerable savings to each library in the shared purchase of computer hardware and software and in joint payment of on-going costs.

- There could be considerable savings to each library in the purchase of expertise required for project management. Staff could be shared by all participants.

- There could be considerable future savings to each library for the combined operations of certain library functions. For example, resource sharing between a group of libraries could be more efficient when their resources are accessible in one computer.

Concerns:

- There could be difficulties politically to establish a project with a number of participants, especially with respect to decision-making and funding since a number of library boards and municipalities would be involved.

- If the computer system is installed at a central facility, there could be problems related to who owns it and who is responsible for its operation.

- If a shared computer facility is used by participants, the allocation of and payment for on-going costs could be complex.

- There are possible problems in the implementation of a combined project of any significant size. How will project management be provided? What are the priorities for systems implementation? When will each library system be brought on-line in a phased implementation? The more jurisdictions involved, the more complex this could become.

- There could be extensive on-going computer communications costs if a central computer facility is used to any extent, especially if the participants are quite remote from that facility.

2.1.2 Administering the Process

Consideration must be given to appropriate administration of the feasibility study to ensure successful and timely completion. Points to consider include the following:

- Commitment of library management is a necessity. You and your board must be aware of what is being done, how it is being done and who is doing it. You are examining the viability of automation in your library and must be willing to allocate sufficient staff time to the process and be prepared to evaluate the documentation as produced.

- Establish immediately whether the library will need outside assistance with the feasibility study, and if so, to what level. The need for this assistance may be related to lack of internal staff to assign to the project, or to insufficient expertise and confidence on the part of your own staff for them to feel comfortable with the feasibility study on their own.

- Establish a steering committee for the automation project. This committee could consist of representatives from library management, the Board, Municipal Council, and the municipal data processing department. The committee will provide guidance to library staff who are working on the feasibility study. The steering committee also serves as a communications mechanism to interested parties within the municipality.

- Set up a project team of two or more staff to do most of the work if possible. Delegate responsibility for the project to these people. Realize that they will be fully involved with the project at certain periods and will be unable to perform all their regular duties during these periods.

- Keep all levels of library staff informed as to the progress and status of the project. This may be their first experience with library automation. Good staff relations are essential.

- Create a project plan as a guide for the feasibility study. The project plan will identify the work that must be accomplished, tie time and personnel to the process and provide a framework in which to operate.

With regard to the project plan, a fairly extended timeframe is recommended since, to quote Murphy's law, "everything that can go wrong will go wrong"; the feasibility study may take longer to complete than planned. To perform an adequate feasibility study, it is advisable to allow six months to a year elapsed time. This does not mean that your staff are working on the project full time. There are certain periods of time when the project team will be waiting, for example, for data to be collected or for automation vendors to

provide costs. The foregoing is applicable to a study involving a computer system with several library applications. If you are considering the purchase of a micro-computer for limited applications, the time requirements involved would be considerably less.

2.2 Defining Automation Benefits

When considering the viability of an automated system or service, the library must carefully define the benefits which can be expected.

These benefits can be designated as either tangible or intangible. The former relate to potential dollar savings in the costs of operating a library service as available through the displacement of a number of present manual routines by the introduction of automation. The latter relate to major future improvements in library services which can be provided through the capabilities of an automated system. Both types of benefits should be considered as important factors in making the decision to purchase an automated system, even though the intangible benefits cannot be carried through into a cost-benefit analysis.

2.2.1 Tangible Benefits

Tangible benefits are definable through a comparison between the capabilities of an automated system and those of the present manual systems being replaced. You have already determined what you will be studying in the way of automation, e.g., cataloguing, acquisitions, circulation control, etc., and have some knowledge of how automation will impact your library routines. This knowledge has been gained through attending seminars and demonstrations, talking to colleagues, reading the literature, etc.

Present library routines can be described and costed and the impact of displacement by automation can be dollar quantified. Potential cost displacement can be determined on a weekly or monthly basis, and projected on a yearly or multi-year basis. These savings can then be carried through into a cost-benefit analysis where automated system costs are compared directly to potential savings through automation. The break-even point, that point in time at which expenditures incurred are equal to benefits accrued, can then be calculated.

The tangible benefits of automation and associated potential savings are described below under the following headings:

- Staffing - Cost Displacement
- Staffing - Cost Avoidance
- Supplies, services and equipment costs
- Consolidation of potential cost savings.

The first area to be discussed relates to those staff intensive manual routines in the present library environment which will be displaced or

significantly altered through the introduction of automation. Potential cost savings can be calculated in dollar quantifiable terms which are equal to the reduction in the staffing necessary to operate the basic routines. This can be projected on a yearly basis or over a number of years.

The second area, cost avoidance, relates directly to the first area. Future cost avoidances for staffing can be calculated by establishing the growth rate for various library services in your library and relating this to potential staff cost savings in the first area.

For supplies, services and equipment costs, the present cost of forms, maintenance contracts for equipment, etc., used in the various automation impacted procedures and routines can be noted on an annual basis. These can be included as claimable benefits for use in the cost-benefit analysis.

Staffing - Cost Displacement:

The introduction of an automated system may enable your library to replace some staff intensive library routines with more cost-effective means of operation. Potential savings in staffing is referred to as cost displacement.

Cost displacement may occur in a number of ways. It may mean simply that staff time and associated dollars as made available through automation will be utilized elsewhere within your library system. Staff time freed up from certain labour intensive activities will be reallocated to other services. Depending on your staffing circumstances, cost displacement may also include a "reducible" component in that the numbers of staff can actually be reduced to some extent. This may occur through attrition after implementation has been completed.

The measurement of cost displacement is a relatively complicated process requiring a number of steps. Your project team will investigate the present system(s) in use. A simplified method for doing so is noted as follows:

- Present manual routines and tasks associated with each function to be considered for automation are outlined in some detail through interviews with the appropriate supervisors and staff.

- Available statistics for each of the functions are obtained, as are salary levels for library staff whose duties relate to the functions under study.

- Those procedures within each manual routine which would be either eliminated or significantly impacted through automation are isolated; routines which would continue either unchanged or be replaced by routines requiring equivalent time are not studied further.

- Estimates for the amount of time spent either on a weekly basis or per unit for eliminated and/or impacted routines are

obtained through discussions with supervisors and staff. The methodology used in the building of these estimates will vary from routine to routine, depending on available statistical data and the nature of the routine.

- Present costs of operation for each displaced routine are calculated up to an annual basis using the appropriate salary level(s) plus benefits on either the weekly time estimate times fifty-two or on the per unit time estimate times the annual statistical data.

- Annual cost displacement by function is obtained simply by adding together the cost for each displaced routine within that function.

- Total annual cost displacement can then be calculated for the functions under study. These figures are for use in the cost benefit analysis.

To illustrate the process just described, Figure 1, on pages 17 - 18, displays reserve procedures for Middleville Public Library. This is a medium sized public library using a photocharge circulation system in its main library and one bookmobile. Specific tasks within the reserve function are noted; these include taking the reserve, preparing reserve files, trapping reserves, filling reserves and file maintenance. Each step of the process is noted in detail. The impact of automation is noted as to whether a procedure will be replaced by something requiring equal time, or will be eliminated. Staff levels are noted as are volumes and time requirements for eliminated or significantly impacted areas. In Figure 2, on page 19, these weekly estimates are attached to appropriate salary levels, plus benefits and multiplied to an annual cost displacement for the reserves function.

The total yearly claim of $5,715 for staffing - cost displacement for reserves will be used in the cost benefit analysis. Note that this is not the total cost of providing a reserve service, but rather the dollar value of providing those portions which will be offset by the automation of reserve procedures.

Staffing - Cost Avoidance:

The replacement of the present manual system by an automated system may reduce the need for additional staffing in future years, which would be necessary to cope with increased workload in library services due to growth. An examination of past statistics for at least a five year period in your library may show that you are experiencing substantial growth in some areas, e.g. circulation, reserves taken, books acquired, etc. This growth can be factored into an estimate of automation benefits and used in the cost-benefit analysis. For example, dollar savings through cost avoidance for the reserves function in Middleville Public Library are as follows:

- Middleville established $5,715 as the annual potential cost savings for staff displacement for reserves in an automated system.

Figure 1

MANUAL SYSTEM DATA COLLECTION FORM LIBRARY: Middleville Public Library FUNCTION: Reserves
CONTACT: John Doe

SPECIFIC TASK	COMMENTS RE AUTOMATION	ADDITIONAL INFORMATION RE MANUAL PROCEDURE	STAFF LEVEL	WHERE DONE	FREQ	EST VOLUME	EST TIME REQ.	CLAIM NO CLAIM
Taking Reserves								
Patron asks for title in catalogue. Reference staff fills in card with patron/item info.	Equal to input to computer.	Different forms are used for regular reserves, new items to be ordered, ILLO, etc. Bookmobile reserves are put in with Main's if Bookmobile does not have copy.	Ref. Staff	Ref. Desk	Ad hoc	Approx. 3000 requests per year for adult, 1000 for Bookmobile and minimal for Children. Estimate 4000 for total system or 77 per week.		No claim
Preparation of reserve files								
Take batch of reserve cards from desk daily.			Clerk GR 5	Off desk	Daily		6 hr/wk	Claim
Pick out those on reserve already and interfile in reserve file. Sort for Fiction & Non-Fiction. Double check shelves.								
Prepare Visible Index insert strip. File reserve card(s) by author.								

Figure 1

MANUAL SYSTEM DATA COLLECTION FORM LIBRARY: Middleville Public Library FUNCTION: Reserves (cont.)

SPECIFIC TASK	COMMENTS RE AUTOMATION	ADDITIONAL INFORMATION RE MANUAL PROCEDURE	STAFF LEVEL	WHERE DONE	FREQ	EST VOLUME	EST TIME REQ.	CLAIM NO CLAIM
Preparation of Bookmobile Visible Index			Librarian	Off desk	Daily		1 hr/wk	Claim
Trapping of reserves								
Each adult item is checked against the Visible Index before re-shelving	Trapping will be done automatically at Check-in		All desk staff	Circulation desk	Ad hoc	Est. 5 sec each on adult circ	4½ hr/wk	Claim
Filling of reserves								
Retrieve reserve card from file - if last reserve, clear Visible Index strip - phone patron once; - mail card if no answer - process for pickup and place on reserve shelf.	Many of these routines will be eliminated; likely will continue to phone patrons.		Clerk GR 5	Off desk	Daily		2½ hr/wk	Claim 50%
File maintenance								
Take Visible Index to shelves	Eliminated		Clerk GR 5	Off desk	Weekly		1 hr/wk	Claim

Figure 2: MIDDLEVILLE PUBLIC LIBRARY - STAFFING - COST DISPLACEMENT - RESERVES

Routine/Task	Staff Level	Time/week claimed	1983 dollar value per week	1983 dollar value per annum
Taking reserves	Reference Desk Staff	No claim	0	0
Preparation of reserve files	Clerk Grade 5 Librarian C (Bookmobile)	7 hr/wk	$60.69	$3,156
Trapping Reserves	All Desk Staff	4½ hr/wk	$32.67	$1,699
Filling Reserves	Clerk Grad 5	1¾ hr/wk	$ 9.19	$ 478
File maintenance	Clerk Grad 5	1 hr/wk	$ 7.35	$ 382
Total Yearly Claim				$5,715

- The library estimated its annual growth rate for reserves at 10% per annum.

- Middleville estimated yearly cost avoidance by factoring in 10% growth each year on the annual cost displacement figure for reserves, as follows:

	Displacement	Avoidance
1st year	$ 5,715	Nil - base year
2nd year	5,715	$ 572
3rd year	6,287	629
4th year	6,916	692
5th year	7,608	761
6th year	8,369	837
7th year	9,206	921
8th year	10,127	1,013
9th year	11,140	1,114
10th year	12,254	1,226

Since this is a time consuming procedure, especially if you are studying a number of different functions, you may not wish to include it if growth or resulting dollar amounts do not appear to be significant.

Cost avoidance for staffing may be much more complex than that illustrated above. For example, your library may be planning to add a new branch. Automation may allow you to staff this new branch out of your existing staff complement, rather than having to hire additional staff. The non-hiring of this staff can be considered as a cost avoidance.

Supplies, Services and Equipment Costs:

The annual costs of supplies and service contracts as used in the present system and no longer required in an automated system can be claimed as a potential cost saving. This annual figure can be carried into the cost-benefit analysis.

Costs for replacement of existing equipment used in the present system can also be claimed as a one-time savings within the cost-benefit analysis, if the equipment needs replacement in the near future.

Consolidation of Potential Cost Savings:

All the potential dollar savings available through automation can now be pulled together for the functions included in the feasibility study. These savings are carried through into the cost benefit analysis. Savings can be projected over any period of time, e.g. three, five, seven or ten years, for comparison with automated system costs over the same period.

2.2.2 Intangible Benefits

Like tangible benefits, intangible benefits are definable by a comparison between the capabilities of an automated system and those of the present manual systems being replaced. At the same time as you are studying your present system for dollar-definable

benefits, your are also isolating intangible benefits.

Benefits which are discussed here are restricted to those areas which can be described as providing major future improvements in library service over and above those benefits available through the displacement of present routines by automation. Whereas these latter tangible benefits can be assigned a dollar value in terms of potential savings through automation, the former intangibles cannot be realistically assigned any dollar value, as they do not directly relate to present dollar measurable activity. Although it is not possible to dollar quantify intangibles and take them through into a cost-benefit analysis, they are an important factor in any decision to purchase an automated system. Some of the intangible benefits which may have a major potential impact on library services can be described under the following headings:

- Quality of service to library users
- Efficiency, accuracy and timeliness of library routines
- Management information.

Quality of service to library users:

An automated system may provide your library with the capability to provide an enhanced quality of service to users which is not possible with the present manual system. This enhancement of service levels could be either a quantum leap or a giant step over what you are currently providing.

- The quantum leap may be illustrated in the case of the library which does not provide any catalogue access to its collection for public use. Provision of a microform catalogue from a machine-readable database of library holdings would be a substantial improvement in service; however, this benefit of increased access to the collection cannot be assigned a dollar value, and so is termed an intangible benefit.

- The giant step may be illustrated in the case of the multi-branch library which provides catalogue access to branch collections, but not to the total system collection. Introduction of an automated system would permit branch access to the total collection, either by microform catalogues or on-line terminals. This increased service benefit to users cannot be dollar-quantified, and so is termed an intangible benefit.

In the first example, the user moves from no access to sophisticated access; in the second example, the user moves from partial access to extended access.

Efficiency, accuracy and timeliness of library routines:

The general efficiency, accuracy and timeliness of library routines may be substantially improved through the introduction of an automated system. Manual systems by their very nature are complex and error-prone as numerous steps and manipulation of a significant

number of paper files are required. An automated system may simplify and shorten many of the processes and will eliminate certain paper files. Although staff savings in these areas are dollar definable, the value of increased general operational efficiency cannot be defined in dollars and is thus an intangible benefit.

Management information:

An automated system may include the capability to produce sophisticated management information for planning and decision-making. In the manual environment, this information is either not available or not easily accessible. An automated system maintains statistical data on library activities which can be easily manipulated for the purpose of producing a variety of statistical and management reports. This output will assist planners and decision-makers in collection development, staff utilization, the development of performance measures for library services, etc. The value of this increased availability of information is not dollar-definable and is thus an intangible benefit.

2.3 Defining Automation Requirements and Costs

When considering the viability of an automated system or service, the library must define its automation requirements and from these requirements obtain costs for purchasing, implementing and operating a system. Library management has already defined what is to be looked at in the feasibility study. The project team must now proceed to write out in some level of detail what the automated system must provide. This information can then be submitted to a number of vendors in order to obtain cost estimates to be used in the cost-benefit analysis.

2.3.1 Requirements

In defining automation requirements at the feasibility stage, more than one approach is possible. A formal Request for Information (RFI) may be prepared and issued to a range of vendors or minimal amounts of pertinent information may be collected and forwarded to one or more vendors. The difference is the amount of detail incorporated in the document. If a library is considering the purchase of a single service, the document may be fairly short; if the library is looking at several automated applications, greater detail will be required.

There are a number of reasons why your library may wish to prepare and use a relatively detailed document. These are as follows:

- Familiarity -- You and your project team will learn a lot more about your automation requirements by working through the exercise of writing them down.

- Definition -- You will be defining your ne in a logical manner which will enable the vendors to respond with appropriate computer hardware and software to meet your needs.

- Confirmation -- From reading the literature, talking to colleagues, etc., you will have some idea of systems available in the marketplace. An RFI will serve to confirm what vendors are able to provide.

- Costs -- You will be receiving cost estimates based on your requirements.

The Request for Information:

Should the library elect to develop an RFI, it should bear in mind that in 1984 there is no need to reinvent the wheel. A number of excellent RFI's have already been developed by other library systems. These should be reviewed and then cut and paste with thought. You will, of course, adapt them to your needs. Certain portions will be unique to your library.

An RFI usually consists of a number of sections, as follows:

- Statement of intent

- Library profile

- Description of your application requirements, with space for the vendors to indicate their capabilities vis a vis your requirements

- Request for vendors to indicate the proposed hardware and software necessary to meet your requirements

- Request for cost estimates for purchase, installation and maintenance of the proposed system.

The Statement of Intent:

The statement of intent indicates which library functions are being considered for automation and includes, as well, a statement that a non-exhaustive reponse from the vendor is acceptable, since this is a request for information only and funding for the project is not in place.

Library Profile:

The library profile includes the name and address of each library outlet, as well as statistics projected over several years which are relevant to those areas which are being considered for automation. This will give the vendor an indication of the size of the library, volumes handled, growth expectations, etc. You may also wish to include the library's own estimate of terminals for access to the automated system and where these are to be located. Figure 3 illustrates a sample profile for Middleville Public Library which has a main library and a bookmobile.

Figure 3: Middleville Public Library Profile

Statistics	1984	1990
Volumes	215,000	250,000
Titles	125,000	145,000
Patrons	28,000	32,500
Circulation	650,000	754,000
Overdues Sent	14,000	16,000
Reserves Placed	4,000	6,000

Terminal Requirements:

Main Library	4 Circulation (3 adult, 1 juvenile) 2 Technical Services
Bookmobile	1 Circulation
Total Terminals	7 (all with light pens to read barcodes and printers to produce hard copy information.)

Application Requirements:

The application requirements indicate to the vendor what functions the library wishes an automated system to perform. Emphasis is on what is to be done, rather than how it is to be done. Using non-technical language, the project team writes a description for each function which is being considered for automation. Figure 4 illustrates the application requirements for the reserves portion of a circulation system as prepared by Middleville Public Library. Note that Middleville asks whether the system has available the capability to perform what the library requires now, whether the capability requires modification in order to meet the library requirements, or whether the capability to perform the library requirement is in the planning stage or not being planned at all. It is important to ask the vendor to specify dates with respect to any planned capabilities. Space should be left for vendor comments, or for the vendor to indicate that he has provided explanations elsewhere.

Vendor Proposed Hardware and Software:

The RFI should state that it is the vendor's responsibility to propose a system to meet the library's requirements. The vendors should be requested to provide specific information as to equipment (hardware) and programmes (software) proposed. The vendors should also be requested to indicate whether a special computer room is needed,

Figure 4:

Middleville Public Library - REQUEST FOR INFORMATION

		AVAILABLE	REQUIRES MODIFICATION	PLANNED (GIVE DATES)	NOT PLANNED	COMMENTS
3.2.	RESERVES					
3.2.1.	The system normally services reserves on a first-in, first-out basis					
3.2.2.	The system permits a terminal operator with appropriate authorization to modify the reserve queue					
3.2.3.	The system permits reserves to be placed:					
3.2.3.1. -	on a first-copy-available basis					
3.2.3.2. -	on a specific copy					
3.2.4.	The system does not restrict the number of requests which may be placed against an item or title					
3.2.5.	The system signals a reserved item at checkin					

Figure 4:

Middleville Public Library - REQUEST FOR INFORMATION

		AVAILABLE	REQUIRES MODIFICATION	PLANNED (GIVE DATES)	NOT PLANNED	COMMENTS
3.2.6.	The system produces a hold slip which includes the borrower's name and phone number					
3.2.7.	The system provides for the automatic cancellation of a reserve if not filled by a specific date					
3.2.8.	The system is capable of printing listings of materials on reserve, including the number of requests against each title.					
3.2.9.	The system is capable of displaying the current reserves for a patron including author, title, and the date that the reserve was placed.					
3.2.10.	The system is capable of printing the list of items above.					
3.2.11.	The system is capable of producing reserve notices in a form suitable for mailing to patrons.					

what kind of data communications are required, what documentation is available on the system, what training is to be provided in use of the system and the availability of on-going maintenance and enhancements for the system.

Depending on the application(s), equipment may include the following components:

- Central processing unit (CPU) which processes the data.
- Disk drives for on-line storage of the library's files.
- Tape drive to allow input and/or output of bibliographic data or other information. A tape drive provides a means to input bibliographic data for cataloguing purposes, output data for production of a microform catalogue and for database back-up for security purposes.
- System printer, usually a high speed printer, for output of major reports notices and statistics for the library.
- Terminals for on-going interaction with the system.
- Side printers for printing information either from the terminal screen or from the system. These are usually slow in speed, attached to the terminal, and used to print short pieces of information such as date due slips, etc.
- Lightpens which are attached to the terminals and are used to input data (usually in the form of bar code numbers) to the computer for check-out, check-in and inventory purposes.
- Portables which are battery-operated data capture mechanisms with attached lightpens. They are used as back-up if the computer or terminals are not functioning, for bookmobile circulation, and for inventory-taking.
- Communications hardware which includes the required devices to attach each terminal to the data communications lines which lead to the library computer. Communication devices also permit dialing out to other computers or dialing in from other terminals.

Software will consist of the operating system for the computer and all the packages necessary to perform the library's applications. The vendors should be requested to describe these packages and indicate the programming languages used.

Vendor Proposed Costs:

The library should request that the vendors provide cost estimates for a system which will meet the library's requirements. Typical costs as received from the vendors usually cover only those services the vendors are providing directly, such as hardware, software, installation, training and on-going maintenance.

The library should allow the vendors at least six to eight weeks to respond to a Request for Information. When the responses are received back from the vendors, the project team will have some basic information as to costs and capabilities as available from the marketplace.

At this stage in the process, the project team should also address two other major considerations for automation which will not likely be adequately covered in the vendors' response to the library's RFI. These relate to communications requirements and possible strategies for building the database for the automated system.

Data Communications Requirements:

In a multi-branch environment, communications lines are necessary to connect terminals at the branches to the computer at the central site. The vendor(s) will specify the type of lines necessary; your project team must then get the requisite line rental costs from the telephone company. There may also be necessary pieces of communications equipment beyond those specified by the library vendor in his response to your Request for Information. This is a complex field with many alternate strategies available; however, at this stage, ballpark costs are acceptable.

Conversion Strategies for Database Building:

A major issue for a library considering automation is how to get bibliographic and patron files into machine-readable form. Patron records are usually entered directly into the computer after it has been installed, each patron in effect being re-registered.

There are a number of strategies which your project team may consider for getting machine-readable bibliographic records. Some of these are noted as follows:

- Key records from the shelf list directly into a computer after installation, using either your own staff or outside personnel hired on a special grant programme. This presumes that the library's internal cataloguing is of sufficient quality to build a database.

- Load machine-readible cataloguing records from an outside source to a computer after installation. Sources used to obtain records could be diverse. For example, search keys (LCCN'S/ISBN'S) for your own internal cataloguing could be sent to the National Library of Canada MARC Records Distribution Service. National Library, in turn, would match the library's search keys against the National Library database, derive the necessary cataloguing data, transfer it to magnetic tape and ship it to the library. The vendor reformats the data for input into the library's computer. This method presumes that research keys are available to send to the National Library. It also requires that once Cataloguing Copy is received, staff check whether the cataloguing is acceptable according to local use. Other sources of cataloguing copy could be other libraries or vendors who maintain a database which

they would be willing to make available. Cataloguing derived from these sources could be mounted into the computer and staff could accept, reject or modify the cataloguing as received.

- Build a cataloguing database at a computer service facility in advance of installing a computer. The advantage to this method is the ability to be able to close the Card Catalogue and produce a microform catalogue without owning a computer. A possible disadvantage is the on-going service bureau costs of maintaining this database if it is not repatriated within a reasonably short length of time to your own computer system.

  There are vendors in the marketplace, e.g. UTLAS, which will offer libraries on-line access to a computer to build and maintain a database. Some libraries have built databases using municipal computers prior to their own in-house automation. Databases as created in the above manner are then converted by the vendor for use in the library in-house computer system.

As noted above, there are a number of choices in building a database and a number of alternatives in implementing any chosen method. There is no one right way. It all depends on the library's needs and available funding.

2.3.2 Costs

It is the project team's responsibility to estimate all costs associated with the purchase, installation and on-going operation of an automated system to meet the requirements as outlined in your Request for Information. At this stage of the process, they are developing cost estimates for the project; not all of these will have been included in the information as supplied by the library automation vendors.

Costs may be divided into those costs as specified by the vendor(s) and other system related costs; each of these may then be subdivided into one-time costs and on-going costs. Vendor specified costs are provided by the vendors themselves within the context of the Request for Information. Other system-related costs must be estimated by the feasibility study project team. The total costs will be utilized in the cost benefit analysis where estimated system costs are compared to the dollar quantifiable benefits of automation.

Specific items which can be costed are noted as follows:

Vendor Specified Costs	Other System Related Costs
One-time costs:	One-time costs:
. hardware	. site preparation
. software	. insurance on delivery of hardware
. other vendor costs (installation, training, etc.)	. project management
	. legal fees for assistance during contract negotiations
	. site visits

On-going costs:

. hardware and software maintenance

. database creation and editing
. labelling and linking of collections
. initial supply of patron cards and barcode labels

On-going costs:

. communications
. supplies
. salaries and benefits for a computer operator

Vendor Specified Costs:

The one-time vendor specified costs include not only hardware and software, but also amounts for other services which the vendor provides such as delivery, installation and training. Note that various taxes and duties may or may not be included in the estimates as received. The on-going hardware and software maintenance costs provided are usually monthly figures from which the library can calculate annual costs and project these over the number of years being used in the cost-benefit analysis.

Other System-Related Costs:

Major one-time costs which the project team may consider, include the following:

- Site Preparation -- In the RFI, the vendors will indicate space and environmental requirements for the operation of the computer. They may or may not indicate a cost estimate for this site preparation. The library can obtain estimates from local contractors for the required carpentry, electrical wiring, heat and humidity control, dust control, etc. or may get an estimate from a similar sized library which has already automated.

- Insurance on Delivery of Hardware -- This is insurance to cover the equipment in transit from the manufacturer's plant to the library installation and is usually calculated as 50¢ per one hundred dollars hardware value.

- Project Management -- If the library decides to proceed with automation after the feasibility study, a project manager will be a necessity. This person may be a current library staff member or expertise may be purchased from the outside.

- Legal Fees -- Legal counsel may be required during contract negotiations with a vendor for the purchase of a system. This can be quite expensive.

- Site Visits -- An amount of money should be budgeted for site visits during the systems evaluation stage of purchasing an automated system. Library staff will wish to validate vendor claims against operating installations.

- Database Creation and Editing -- The library may wish to include in its total system costs monies which will be expended in creating machine-readable files of bibliographic data. The amounts will be dependent upon the conversion strategy chosen, size of collections, etc.

- Labelling and Linking of Collections -- Once the equipment is installed and the bibliographic database has been loaded into the computer, a machine-readable label (barcode) must be affixed to each library item (e.g. book, cassette, etc.) and the label number must be linked to the appropriate bibliographic record on the computer. Labelling and linking can be a relatively expensive proposition in terms of staff time.

- Purchase of the Initial Supply of Patron Cards and Item Barcode Labels -- In starting up a computer system, a large number of machine-readable patron cards and barcode labels are required. Due to the number required, this could be a significant expenditure.

On-going operational costs may include the following:

- Communications -- In a multi-branch library environment, terminals at each branch remote from the computer installation will be connected to the computer with communication lines. The vendor will indicate in the response to the RFI what type of lines are required. The library will request the rental cost for lines from the telephone company. These costs can be calculated on a monthly and annual basis and projected over the number of years being used in the cost-benefit analysis.

- Supplies -- The library will be displacing certain manual supply costs with the supply costs required by automation. The vendor may give some indication of what those costs are, or the library may have to obtain estimates elsewhere. Included are on-going supplies of barcode labels, patron cards, computer paper, any special forms, printer ribbons, cleaning fluids, etc.

- Computer Operator -- This may be a full-time person, or, more likely, several persons assigned on a part-time basis to operate the computer system.

2.4 The Cost-Benefit Analysis

The cost-benefit analysis determines the financial viability of the proposed project. In the case of library automation, library management will want to determine how the costs of automating certain library functions compare to potential cost savings as achievable through automation. A cost-benefit analysis can be a complex process or can involve a relatively simple comparison of automation costs vis a vis defined dollar benefits over a predetermined period of time.

The feasibility study has determined all the costs for the purchase, installation and operation of an automated system which will meet your requirements. In fact, costs for several different systems as available from vendors may have been calculated. The feasibility study has also determined all the potential cost savings through automation. You are now in a position to determine the length of time over which the system will pay for itself -- the break-even point. This is that point in time at which total dollar inflows in terms of benefits equal total dollar outflows for system costs. You will also be able to determine what the return on investment or payback factor will be over a defined number of years.

Middleville Public Library is used to illustrate a simple cost-benefit analysis. Ten years was chosen as the time period over which to project both costs and benefits. One time and ongoing costs, as determined during the feasibility study, are projected, as are benefits achievable through cost displacements and cost avoidance. Current dollar values are used; inflation has not been taken into account.

Figure 5 displays the values used in this analysis, as follows:

- Row A shows an amount in year one; this assumes that the initial purchase and implementation of the system takes place within a one year period, a possible timeframe given that Middleville consists of a main library and a bookmobile. There are no branches at present. The amount includes purchase of hardware, software, training, installation and first year system maintenance. It also includes monies required for other one-time costs such as site visits, legal fees, building a database, labelling and linking collections, etc.

- Row B indicates on-going costs for the system after the first year, including such things as system maintenance, communications costs (nil for Middleville), computer supplies and staff costs vis a vis computer operations.

- Row C shows total expenditures per year. Note that this is a simplified example in that costs in second and subsequent years are for on-going costs only. In a more complex environment, there could conceivably be further one-time costs for more equipment in succeeding years.

- Row D shows cumulative costs for each year for the purchase, installation and operation of an automated system.

- Row E shows annual dollar benefits as available for staffing cost displacements and supplies. Note that benefits start to accrue only in the second year as the manual system costs will remain in place while the system is being implemented during the first year.

- Row F shows cost avoidances for staffing as available. The derivation of this calculation has already been discussed in section 2.2.1 of this document.

Figure 5: Middleville Public Library - Ten Year Cost and Benefit Projection

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
AUTOMATED SYSTEM COSTS										
A. One time costs	210,000									
B. On-going costs	Inc in above	42,000	42,000	42,000	42,000	42,000	42,000	42,000	42,000	42,000
C. Total costs (A + B)	210,000	42,000	42,000	42,000	42,000	42,000	42,000	42,000	42,000	42,000
D. Cumulative cost (C + year x)	210,000	252,000	294,000	336,000	378,000	420,000	462,000	504,000	546,000	588,000
AUTOMATED SYSTEM BENEFITS										
Displacements	Nil	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000
F. Avoidances	Nil	572	629	692	761	837	921	1,013	1,114	1,226
G. Total benefits (E + F)	Nil	80,572	80,629	80,692	80,761	80,837	80,921	81,013	81,114	81,226
H. Cumulative benefits (G + year x)	Nil	80,572	161,201	241,893	322,654	403,491	484,412	565,425	646,539	727,765
I. CUMULATIVE NET BENEFIT (H - D)	(210,000)	(171,428)	(132,799)	(94,107)	(55,346)	(16,509)	22,412	61,425	100,539	139,765

- Row G shows total dollar definable benefits for each year.

- Row H shows cumulative dollar definable benefits for each year.

- Row I expresses the cumulative net benefit. This is calculated by subtracting cumulative benefit from cumulative costs in each year. Note that you start with a negative number in the first year, when costs far outweigh benefits; this number becomes positive in some subsequent year as benefits begin to outweigh costs.

The break-even point for Middleville Public Library can be seen to occur in the seventh year from the year in which system implementation takes place.

The payback factor or return on investment can be determined by dividing the cumulative benefit by the cumulative cost. Over ten years in this case it is 1.24. This means that for each dollar invested by Middleville Public Library, one dollar and twenty-four cents will have been returned after ten years, again counting the years from selection and implementation.

The type of cost-benefit analysis performed and the costs and benefits included in it will depend on the requirements of your funding authorities. As mentioned previously, the above is a simplified example. More complex cost-benefit analyses could include allowances for projected rates of inflation, debt service charges, etc.

2.5 Decision Making

Having performed the feasibility study, library management, the board and funding authorities are in a position to determine whether to proceed with the purchase of an automated system.

The project team will prepare an overview of work performed with findings and recommendations suitable for presentation to the above authorities. These authorities will consider the purchase of a system based on the following major factors:

- Availability of a computer system to meet the library requirements.

- Costs for the purchase, installation, and operation of an automated system vis a vis the dollar definable or tangible benefits as available through automation; in other words, the results of the cost-benefit analysis.

- Increased service levels as available through automation which are not dollar definable in terms of the present library operations, the intangible benefits.

The final decision will likely be the result of a combination of these factors and the reality of whether the municipality itself is in a position to provide funding to the library through the capital and/or operating budget processes. If the decision to proceed with automation is in the affirmative, the municipality gives agreement in principle to the funding of the project. Library management may then proceed with the selection of a system.

If approval to proceed with automation is not received, the work performed within the feasibility study should not be considered wasted. Having analysed your present system as a part of the study, you will probably be in a position to recommend changes which will improve the efficiency and effectiveness of current operations. Staff will also have gained exposure to library automation and should priorities be re-evaluated, and funding become available, the library will be in a position to proceed quickly in the future.

CHAPTER THREE

SELECTION AND PURCHASE

3. SELECTION AND PURCHASE

This chapter outlines the third phase in the automation process, the selection and purchase of an automated system. As with the feasibility study, this is a formal exercise within which your library is performing several definable steps, as follows:

- Selecting the appropriate library automation system to meet its requirements.
- Presenting the recommended system and associated funding requirements to the library board and municipal council for approval.
- Negotiating a contract with the vendor of the selected system.

Chapter 3 on selection and purchase, and chapter 4 on implementation, deal primarily with so-called turnkey, minicomputer-based, multi-purpose library automation systems. If your library is considering purchase of a microcomputer, many of the steps as discussed will be shortened or not applicable.

3.1 Management

As was the case in the feasibility study, management is an important consideration within the process of selecting and purchasing an automated system. At this stage, it becomes even more critical, since you are one step closer to actual implementation of a system. You have moved beyond the point of determining the viability of automation. The library board has recognized your automation needs and municipal council has given agreement in principle to the funding of the project. Vendors will have the expectation that the project is now real, and that the library will be actually selecting and purchasing a system. In addition, the library will be expending significant staff time on the project, as will the automation vendors.

The scope of the automation project was defined at the beginning of the feasibility study in relation to the following:

- Library functions to be automated, for example, circulation control, cataloguing, acquisitions, etc.
- Participation in the project as to a stand-alone system for your library, a shared library/municipal project, or a cooperative venture between your library and other libraries.

Upon completion of the feasibility study and before proceeding with selection and purchase, the library management may be required to look again at the functions to be automated. Responses to the library's Request for Information may have indicated that certain functions which were wanted are not yet available or planned. The library may wish at this point to re-evaluate its requirements and to determine whether it wants to be involved in the development of something new with a vendor.

The question of participants in the project may also come up again. It is quite possible, especially if there has been significant elapsed

time since the beginning of the feasibility study, that circumstances will have changed. This library may either gain or lose partners in the project at this stage.

The administration of the selection and purchasing process contains many of the same components as noted under the feasibility study. Commitment of library management to the project remains a necessity, as does the need to keep staff informed as to what is going on. A steering committee to provide guidance and a project team to perform most of the work associated with the process, are again appropriate, as is the need for a well defined project plan. Again, the library may wish to hire outside expertise to assist staff. What may differ here from the feasibility study, is that at this stage, a formal project manager should be designated. Appointment of a project manager early in the selection process has a number of benefits, as follows:

- Library management will be able to delegate to one person on-going responsibility for the project. This person will determine what has to be done, how it is to be done and who is to do it.

- From the selection stage forward, contact with vendors becomes much more formalized; the project manager provides the initial point of contact for all vendors during the process of selecting a system and subsequent contract negotiation.

- The project manager will provide continuity between the selection and purchase and the implementation of the system.

The person appointed as project manager may be someone already on staff with the necessary aptitudes, skills and interests or it may be someone hired from the outside. The chief librarian should not undertake to be project manager, unless the board fully understands the amount of time which will be required and is willing to release him/her from any other expectations for a relatively long period of time.

The selection and purchase stage in itself may take up to a year or more in elapsed time before a contract is finalized with the selected vendor.

3.2 Selecting the System

Selecting a system to meet your library requirements is a structured process which can be outlined as follows:

- Preparation of a Request for Proposal outlining requirements for an automated system.

- Preparation of an evaluation methodology to be used in evaluating proposals from vendors.

- Issue of the Request for Proposal to selected vendors.

- Receipt of proposals from vendors.

- Evaluation of proposals.

- Selection of vendor of choice.

3.2.1 Preparation of the Request for Proposal

A Request for Proposal (RFP) is a formal request from an organization for a vendor or vendors to make proposals for the provision of a system which will fulfill the organization's requirements. It is not a bid in the traditional sense, since a bid usually contains very detailed specificiations on products desired, whereas in a Request for Proposal, the library provides the vendor with certain technical and functional requirements and the vendor is fairly free as to how he meets these requirements.

Usually the RFP is sent to a number of selected vendors whom you have determined during the feasibilty study to be able to fulfill your needs. The RFP may, under certain circumstances, go to only one vendor, if it has been determined that this is the only vendor who can meet the requirements, and if the municipal tendering process allows it. Some municipalities may require that the library go to public tender and advertise in the local press or elsewhere for responses to the RFP.

The RFP should be issued only if funding for the project has been approved, at least in principle; vendors incur significant costs to respond in the detail required at this time.

The RFP is necessary, since it provides the library with a vehicle to organize information on which to base a decision to select and purchase a system. It also becomes an appendix to any subsequent contract which may be negotiated with a vendor.

Language in the RFP must be concise, clear and unambiguous, allowing no room for incorrect interpretation, which could result in later misunderstandings. Many problems arise over the different interpretation of terminology by library and systems people. The library must clearly state its requirements and the vendors must clearly indicate their capabilities.

Presentation format is also important. It should allow for ease of use by both the library and the vendors. For example, divisions and subdivisions should be clearly numbered. Overkill on information may be as bad as lack of detail. Grid systems are an effective way to have the information displayed.

Time requirements to develop an RFP can often be underestimated. A number of library staff should be involved in its development. Use consultants if appropriate, but understand that you need to develop in-house expertise as well. You can start with a set of model specifications or someone else's, but the final product is a statement of **your** needs alone.

If your staff prepared a Request for Information as part of the feasibility study, you will notice that some of the components of a Request for Proposal are similar to those in the Request for Information. These may be expanded, amplified, or changed in the

development of the RFP. Other components are entirely new to the RFP.

The formal Request for Proposal contains a number of component parts, as noted below. How these components are ordered in the document is a matter of individual choice and style.

- Statement of intent.
- Vendor response requirements, indicating how the vendors must respond in their proposals.
- Evaluation criteria, indicating to the vendor how their proposals will be evaluated.
- Vendor profile, asking vendors to describe their companies and their experience with other libraries having similar requirements.
- Library profile, indicating to the vendor the present size of your operations and expected growth patterns.
- Application requirements, indicating what the library's requirements are, with space left for the vendors to respond, point by point, as to their current and planned capabilities.
- Technical description, asking for a description of vendor proposed hardware, software and system support which will be necessary to meet the library's requirements.
- Costs, asking that vendors provide costs for all equipment and services as proposed.
- Contractual expectations, asking that vendors accept certain pre-conditions in negotiating a contract for services.

Statement of Intent:

The statement of intent invites proposals from vendors for the provision of an automated system and associated operational support. It gives an overview of what the library wishes to automate and indicates that you have approval in principle for funding of the project.

Vendor Response Requirements:

This component outlines the conditions or rules by which the vendor must respond to the Request for Proposal. The library will include a number of standard instructions and requirements, as follows:

- The vendor is required to inform the library if it is responding to the RFP.
- The acceptable date for vendor withdrawal of a proposal, if submitted.

- Deadline for proposals to be accepted for consideration.
- The name and address of the person to whom responses are to be sent.
- How many copies.
- The name of the person to contact concerning clarification of items in the Request for Proposal.
- Whether there will be a vendor conference, and, if so, when and where.
- Bid bond requirements (if applicable).
- A statement that the library is not liable for costs incurred by the vendor in responding to the RFP.
- An indication that the vendor must answer all sections of the RFP, using the same numbering and in the order presented.
- Approximate date by which vendors will be notified of the results of the selection process.
- That the library is under no obligation to accept the lowest or any proposal for an automated system.
- That an amended proposal may be required from a vendor or vendors.

Evaluation Criteria:

This component indicates to the vendors in a general fashion, the factors on which their proposals will be evaluated. Standard evaluation criteria may include the following elements:

- Compliance with the application requirements.
- Cost.
- System reliability, both for hardware and software.
- Post-installation maintenance support.
- Capability for system expansion and upgrading.
- Credibility of the vendor, including financial viability and stability, past performance in meeting commitments with other clients, etc.

Vendor Profile:

In this component, the library requires that the vendors provide certain information about themselves as to their corporate structure, financial status, and the qualifications and experience of their staff which would be assigned to the project. The vendors are asked to

provide a list of sites where they have installed systems similar in size and capability to what they are proposing for your library; contact names at these sites are also requested.

Library Profile:

This component provides the vendors with an overview of your library which will help them to propose an appropriately sized system. This profile may be quite similar to that in section 2.3.1, where the Middleville Pubic Library was used as an illustration. Volume and activity statistics for functions to be automated are provided, as well as future growth estimates in these areas. Information is also provided as to the expected number of library terminals, their location and use.

At the Request for Proposal level, the library should also estimate average and peak load expectations for library activities, so that the vendor can provide the appropriate computer capacity to handle the load during busy periods without system response time slowing down to an unacceptable level.

Application Requirements:

This component presents the vendors with a detailed description of the functions which are to be performed by the system. A separate section should be allocated to each function being considered, such as acquisitions, cataloguing, circulation control, etc.

As with the RFI, the emphasis is placed on what is to be done, rather than on how it is to be done. Requirements are written in clear, concise language with a minimal use of any technical jargon. The written requirements at this stage, however, are developed to a greater level of detail than in the RFI. To illustrate this point, Figure 6 provides a set of requirements, as prepared by Middleville Public Library for the reserves portion of a circulation system. This can be compared to Figure 4, which illustrates the RFI statement of reserve requirements. Note that Middleville Public Library consists of only a main branch and a bookmobile; reserve requirements would be much more complex in a multi-branch environment.

As was the case in the RFI, the vendors are asked to respond as to whether a certain capability is available now, whether the current capability requires modification in order to meet the library requirements, or whether the capability to perform the library requirement is in the planning stage or not being planned at all. If a capability is planned, the vendor is asked to specify dates as to when it is expected to be available.

In the RFP, note that each element or capability may be assigned a value based on its importance to the library. These values can be "mandatory" and several levels of "desirable". This is for assistance in later evaluation, and also gives the vendor some idea of the relative importance to the library of specific capabilities.

Figure 6: Middleville Public Library -Request for Proposal

	REQUIREMENT DESCRIPTION	REQUIREMENT WEIGHT	BIDDER RESPONSE
7.6	**RESERVES** General Description: The purpose of this function is to reserve desired items for requesting patrons. When item is found or checked in it is placed in a hold area and the requesting patron notified that the item is available for pickup.		
	Prior to confirmation of reserve		
	7.6.1. Displays the location, circulation status and reserve queue status of all copies of a title.	M	
	Item not "on shelf" (e.g. in circulation)		
	7.6.2 Permits reserve to be selectively placed on		
	7.6.2.1 a first-copy-available basis	M	
	7.6.2.2 a specific copy	M	
	7.6.3 Inhibits duplicate reserves placed by same patron.	M	
	7.6.4 Provides the capability for recall of items which are overdue at the time the reserve is placed.	DS	

BIDDER RESPONSE CODE

A: AVAILABLE B: REQUIRES MODIFICATION C: PLANNED - GIVE DATES D. NOT PLANNED

Figure 6: Middleville Public Library -Request for Proposal (cont'd)

	REQUIREMENT DESCRIPTION	REQUIREMENT WEIGHT	BIDDER RESPONSE
7.6.5	Provides the capability for recall of items on reserve which have become overdue after the reserve was placed.	D5	
7.6.6	Allows insertion of a cancellation date on a reserve placed.	M	
7.6.7	Inhibits placement of a reserve on certain material types (e.g. reference)	M	
7.6.8	Processes reserves in a first-in, first-out basis.	M	
7.6.9	Provides authorized staff the capability to rearrange the reserve queue.	D5	
7.6.10	Removes patron from reserve queue when reserve is filled.	M	
7.6.11	Provides authorized staff the capability to cancel any one and all reserves on a title.	M	
7.6.12	Provides authorized staff the capability to cancel any one and all reserves for a patron.	M	

BIDDER RESPONSE CODE

A: AVAILABLE B: REQUIRES MODIFICATION C: PLANNED - GIVE DATES D. NOT PLANNED

Figure 6: Middleville Public Library -Request for Proposal (cont'd)

	REQUIREMENT DESCRIPTION	REQUIREMENT WEIGHT	BIDDER RESPONSE
7.6.13	Provides authorized staff a display of all items on reserve to any specific patron.	M	
7.6.14	Provides for the automatic cancellation of all reserves against a "long overdue" copy, with appropriate notification to staff (see Output: 9.1.25)	D5	
7.6.15	Provides "reserve cancellation" notice to patron(s). (see Output 9.1.16).	D1	
7.6.16	Provides "alert to purchase" report if reserve to copy ratio exceeds library-defined level (see Output 9.1.18)	M	
7.6.17	Provides appropriate notification to staff to reshelve "not picked up" reserves (see Output: 9.1.17)	M	
7.6.18	Reserve status of item must be updated immediately.	M	
	Trapping of Reserved Item		
7.6.19	Checks item out to the "hold area" for predefined period of time.	D5	

BIDDER RESPONSE CODE

A: AVAILABLE B: REQUIRES MODIFICATION C: PLANNED - GIVE DATES D. NOT PLANNED

Figure 6: Middleville Public Library -Request for Proposal (cont'd)

	REQUIREMENT DESCRIPTION	REQUIREMENT WEIGHT	BIDDER RESPONSE
7.6.20	Displays reserve patron information	M	
7.6.21	Permits printing of reserve patron information (e.g. name, phone number, title).	D1	
7.6.22	Permits staff to initiate production of a "reserve availability" notice (see Output: 9.1.15) if unable to contact patron by phone.	M	
7.6.23	Permits authorized staff to override "hold area" time period.	D1	
7.6.24	Items picked up by patrons cleared from "hold area" status through the checkout procedure.	M	
7.6.25	Items not picked up by patrons cleared from "hold area" status through check in procedure.	M	
	Items on-order		
7.6.26	Permits reserve to be placed on item whose status is on-order.	D5	

BIDDER RESPONSE CODE

A: AVAILABLE B: REQUIRES MODIFICATION C: PLANNED - GIVE DATES D. NOT PLANNED

Technical Description:

This component requires that vendors propose a system configuration to meet the library's requirements. Specifically, the vendors are asked to propose hardware, software, and associated technical assistance such as hardware and software maintenance, installation, and training support. They will also be requested to provide certain other technical information, including a description of the requirements for the preparation of a computer room and a description of the type of lines required for communications (in a multi-branch environment). Vendors may also be required to indicate if conversion assistance is available for building machine-readable databases. This component of the RFP is quite similar to the RFI. Therefore, for further elaboration as to detail, please see section 2.3.1 of this report.

It should be noted that the vendor will usually provide information only, with respect to computer room preparation, communications requirements and data conversion strategies. Based on this information, the library will approach local contractors and the telephone company for services and will possibly utilize the conversion strategy assistance as proposed by the vendor for the building of databases.

Vendors will also be asked to describe in some detail the tasks necessary to implement the automated system, incorporating both the vendor's and the library's responsibilities and tieing these to a suggested project implementation plan. The final implementation plan will be mutually determined by the library and the selected vendor prior to the signing of the contract.

Costs:

This component in the RFP requires that vendors provide firm costs, valid for a specified period of time, for the purchase, installation and operation of their systems. Costs, as displayed by vendors, should include a summary, as well as itemized listings of specific items and services to be purchased. Again, this component of the RFP is similar to the RFI. What is different here is that costs are firm, rather than estimates and that the library is requiring a substantially more detailed breakdown. Vendor costs at this point should also include applicable duties and taxes.

Remember that, as already noted in the feasibility study (section 2.3.2), the vendors will not provide all costs as associated with purchase, installation and on-going support of an automated system. You have already estimated these other costs during the feasibility study and will update them as part of selecting a system.

Contractual Expectations:

This component requires that the vendors indicate acceptance or rejection of certain pre-conditions for negotiating a contract. Some elements which your library may wish to include are as follows:

- The RFP and the vendor response will become part of the final contract.
- The vendor must submit his standard contract with his proposal if he expects to use this in negotiations.
- Suggested payment schedules for hardware, software and other services.
- Suggested acceptance test schedules for use as milestones during system implementation.
- Posting of a performance bond by the vendor to indicate his good faith to provide services.
- Suggested penalty clauses for vendor non-performance during implementation.
- Termination clauses in the event of non-performance by the vendor.

These pre-contractual expectations may be viewed as a first negotiating position by the library, as the vendor's standard contract and his proposal may be viewed as a first negotiating position by the vendor.

3.2.2 Preparation of Evaluation Methodology

Some form of structure is necessary during the evaluation part of the selection process, in order to ensure that a thorough analysis of the vendor responses to your Request for Proposal is performed. At the feasibility study stage, library management was primarily interested in cost estimates and in the general capabilities of the various systems. Now, you are concerned with actual costs and in very specific capabilities, as they relate to your library. You are also concerned that the process of selection be as objective as possible, and that the end result be the selection of the system which best fits your needs.

Preparation of the evaluation methodology to be used in the selection of the chosen vendor takes place both during the period over which the Request for Proposal is being prepared and immediately following its issue. The evaluation criteria and a mechanism for scoring vendor proposals should be in place before proposals are received back from the vendors. This is to ensure that the project team will be in a position to move quickly in the evaluation of the proposals, because prices as quoted are valid for only a specified period of time. In addition, you will have a deadline to meet for presentation of your selection to the appropriate authorities, in order for them to fit your financial requirements into the municipal budget cycle.

Evaluation Criteria:

There are a number of methods by which your project team may evaluate vendor proposals. The simplest of these is that the proposal with the lowest price wins. Lowest price includes all vendor initial

costs for the purchase of a system. Another method is least cost for the purchase, installation and on-going operation of a system, for a specified number of years and can include a number of cost factors, both vendor specific and otherwise. These two methods may not be acceptable in your situation, as they do not include a number of other important factors which are of interest to the library. A third method, which involves the assignment of weightings to a number of predetermined variables, only one of which is the cost component, is probably more appropriate in making your selection of a library automation vendor. Variables in addition to cost in this scenario, will include basic system capabilities and a number of vendor related considerations. These three criteria are discussed below.

Costs:

Vendors will provide in their proposals certain costs for the purchase, installation and on-going operation of an automated system for your library. These will be the same cost elements as discussed in section 2.3.2 of the feasibility study. To reiterate, they include one-time costs for hardware, software, installation and training, and on-going costs, specifically, vendor-provided maintenance for hardware and software. All applicable duties and taxes should be included for the above. These costs will be included in the evaluation of vendor proposals.

There are certain other cost elements for an automated system which are not provided specifically in vendor proposals and which must be addressed to enable fair comparison of systems. In a multi-branch environment, the library will have to consider communications costs between remote branches and the central computer site. Communications requirements may differ significantly from vendor to vendor, depending on strategy and equipment used. The vendor has provided communications requirements; you are required to get actual line rental costs from your local telephone company. A second cost element, where the vendors will indicate requirements but not costs, is in relation to site preparation for your computer room. Again, vendor requirements may vary significantly and the library will have to obtain costs from local contractors. These costs must also be included in your comparison of system costs.

There are certain other cost elements, as already described in the feasibility study, section 2.3.2, which are not provided specifically by the vendors and which the library may wish to consider in its evaluation of system proposals. Many of these may be excluded if the library is able to determine that they are approximately equal for each vendor proposal and that they are therefore irrelevant to a comparison of the proposals.

After determining the cost elements which will be included in the evaluation, the library may display them over a specified time period. This will allow comparison of systems as to their one-time and on-going costs, as applicable to each vendor proposal. This can be a very similar display to that which was used for cost estimates in the feasibility study.

System Capabilities:

The library must evaluate the systems' capabilities as available from each vendor. This may be divided into two areas -- the extent to which each vendor is able to meet the library's application requirements as specified in the RFP, and whether the equipment itself, as proposed by each vendor, meets certain technical and other requirements.

The RFP has asked vendors to respond, point by point, as to whether their systems can meet the application requirements. In the evaluation, the project team will consider the vendor's actual responses and validate these against vendor supplied literature such as terminal operator's manuals, technical system descriptions, etc., information as gathered at site visits to libraries where the vendor's systems are operating, and vendor demonstrations. This can be a fairly time-consuming process.

The RFP has also asked that vendors propose appropriate system configurations for the library and provide a technical description of each item of hardware and software included. If the system being selected is large (e.g. multiple applications), the library may wish to obtain the services of a hardware equipment consultant to assist with evaluation. Otherwise, the project team will look at certain equipment considerations. They will compare the equipment as proposed by each vendor and as an adjunct to the site visits, will observe and ask questions about equipment in place. Some considerations vis a vis the technical aspects of the system include the following:

- Ease of use of equipment for staff and public.
- Flexibility of the system to accommodate current and future library policies (e.g. can fines values be easily changed for overdue books?).
- Specific hardware considerations such as size, speed, upgradability, standardization, reliability.
- Specific software considerations such as use of standard programming languages, available documentation, and reliability.
- Response time for library transactions such as check-in, subject inquiry, etc.

Vendor Considerations:

In addition to costs and system capabilities, the project team will consider a number of other factors related to the vendors and their proposed services. Although some of this information will be available from the vendor responses to the RFP, other information must be gathered through site visits, reference checks, etc. Factors to be investigated may include the following:

- System Maintenance -- Will the vendor provide regular, on-going maintenance for the total system (hardware and software) and has he provided reliable maintenance at other library sites?

- Trouble Shooting -- Does the vendor maintain a service to respond to emergencies such as hardware or software failure and how effective has this service been at other library sites?

- Company Developments -- What is the financial stability of the company? What are its plans for future library system development?

- Documentation -- Does the vendor provide clear, complete, comprehensive and up to date documentation on the system and its use?

- Experience -- What are the qualifications of the vendor's staff to be assigned to the library? How many public library installations have they successfully implemented?

- Credibility -- Has the vendor been able to fulfill commitments to previous clients?

- Consequences of Failure -- Will the library be able to continue operation of a vendor's system in the event that the company leaves the marketplace?

- Installation Support -- Does the vendor provide adequate training and other support to the library during implementation and afterwards?

Scoring the Vendor Proposals:

A first step in scoring is to determine what the weighting will be for each of the broad evaluation criteria. Weightings can most easily be expressed as a percentage out of a total of one hundred percent. The vendor which scores the highest percentage in total is the selected vendor. For example, cost may be assigned forty percent, system capabilities forty percent and vendor considerations twenty percent. It is up to the individual library to determine these relative values.

Assignment of percentage for cost is straightforward. The system with the lowest costs over a specified period of years gets the full possible percentage, in this example, forty. The other systems receive points relative to the low system. For example, if the lowest proposal is $500,000 over ten years and the proposal being worked on is $555,000 over ten years, the calculation is made as follows:

Low proposal = $500,000
This proposal = $555,000 = $\frac{500}{555} \times 100 = 90 \times .4 = 36$

The low proposal receives forty percent and the proposal being worked on receives thirty-six.

Assignment of percentages for system capabilities and vendor considerations operates in a different way, in that any arbitrary

number of evaluation points can be assigned to any number of details. For example, maximum allowable evaluation points for system capabilities may total 1000 or 5520 or any figure. An individual vendor will earn a score out of the total. His score in relation to the total possible score must be converted to a value relative to the total percentage allowable for system capabilities.

For example, a vendor may have earned 850 points out of 1000 possible points for system capabilities. Given that system capabilities are worth 40%, the calculation is as follows:

$$\frac{850}{1000} \times 100 \times .4 = 34$$

Points for vendor considerations are assigned and calculated in the same way. The percentages earned in each of the three areas are totalled for each proposal. The proposal with the highest score is the selected vendor.

Assignment of evaluation points for system capabilities and vendor considerations can be a relatively detailed process. For example, if multiple applications are being considered, which is more important to the library, circulation or acquisitions, or are they equally important? Within each function, the relative importance of sub-functions should also be considered. For example, within circulation control, what is the relative importance of reserves vis a vis check-out and check-in? The same strategy may be used for equipment considerations within system capabilities and for vendor considerations when assigning evaluation points.

In assigning points to each element, it is important to allocate enough points at the detail level to be able to differentiate between the capabilities of each proposal.

3.2.3 Issue of Request For Proposal and Receipt of Proposals

The issue of the Request for Proposal is a formal process. The document should be sent only to those vendor(s) whom the library has previously determined through the RFI or by other means to have systems appropriate to its needs. The only exception to this applies to the library whose municipality requires a public tender. The vendors should have been previously contacted by phone, in order to give them advance warning that a proposal will be requested. Vendors should be allowed at least eight weeks to respond, as the process for them at this stage is detailed and time consuming.

In the interim between the issue and receipt of proposals, the library may wish to hold a vendor conference which all vendors may attend. This open forum gives the vendors the opportunity to request clarification of any ambiguities in the RFP. If you do not hold such a conference, any additional information supplied to a vendor at his request should also be supplied to all the other vendors. In the event of telephone contact, points discussed vis a vis the RFP should also be put in writing and distributed to all vendors, if appropriate.

Receipt of proposals is also a formal process. The RFP has specified a date beyond which proposals will not be accepted. All proposals

should be opened at the same time and contents noted.

3.2.4 Evaluation of Proposals and Selection of Vendor

Evaluation of the proposals requires a considerable amount of time; your library may wish to allow as much as eight to ten weeks for this process.

Following the opening of the proposals, the project team must first become familiar with the contents of each. The proposal itself will be short and succinct; however, each vendor will also have included supporting documentation on products and services.

Once the project team is familiar with the vendor documentation, some division of responsibilities may take place. Team members may be assigned sections of the proposal for evaluation. Using the evaluation criteria as developed in section 3.2.2, responses will be compared in the areas of cost, system capabilities and vendor considerations. Information should be tabulated in chart form or in some other structured manner. For two of the major areas -- system capabilities and vendor considerations -- information must be validated against site visits and reference checks.

Once the comparative analysis of systems is completed, the project team is now ready to apply the scoring methodology as noted in 3.2.2 to each of the major evaluation criteria. From this exercise, the library will rank the vendors as to first, second, third position, etc.

3.3 Decision Making

Now that a first choice vendor has been selected, recommendations must be prepared for library management, the board and funding authorities, in order that a decision can be made as to whether to enter into contract negotiations.

The project team will prepare an overview of work performed in selecting the system, with findings and recommendations suitable for presentation to the above mentioned authorities. The cost-benefit analysis, as prepared in the feasibility study, will be updated with the actual costs of the selected system. As in the feasibility study, dollar definable benefits of automation will be compared with the costs for the purchase, installation and on-going operation of the automation system, as provided by the selected vendor.

The appropriate authorities will consider whether to authorize the library to enter into contract negotiations with the recommended vendor. Final agreement to purchase a system is, of course, dependent on successful contract negotiations with the selected vendor.

3.4 Contract Negotiations

After receiving approval from the appropriate authorities to proceed with contract negotiation, the library will contact the selected vendor. Unsuccessful vendors will also be notified of their status. In the event that the library is unable to negotiate a satisfactory

contract with the first choice vendor, they may wish to retain the option of negotiation with the second choice vendor.

The pre-contracting conditions in the RFP will have briefly indicated the library's initial bargaining position and the selected vendor will have responded to this position in his proposal by indicating acceptance or rejection of each clause. The vendor may also have submitted his standard form of contract for the library's perusal.

3.4.1 Negotiation

As the word implies, negotiation of a contract involves give and take on the part of both the library and the vendor. An adversarial position should be avoided if at all possible. The library, and the vendor, are establishing the basis of a relationship which should last for a long time. The library wishes to obtain an automated system which meets its needs at a reasonable cost. The vendor is running a business and has the expectation of making a reasonable profit on services rendered.

During contract negotiation, the library will wish to obtain the services of a lawyer, since it is a legal document that is being prepared.

Although it is unlikely that the library will accept the vendor's standard form of contract in total, it is a good place from which to start negotiations. As negotiations proceed, amendments and additions will be made as agreed to by both parties and documented. There may be changes to system capabilities as originally requested; there will likely be changes to equipment as initially proposed, with resultant changes in cost. An implementation plan will be worked out, as will the timing and content of the necessary system acceptance tests. The payment schedule will be agreed upon, and tied to the various stages of the implementation plan. Penalty clauses may be included, as some protection for the library and the vendor, in the event of non-performance by either party. Some form of termination clause will be included to cover the eventuality that either party wishes to terminate the agreement. A set of definitions may be attached to the contract to clarify the language and help prevent misunderstandings of what is meant by a particular term. The library's Request for Proposal and the vendor's response to that Request for Proposal both become appendices to the contract, with amendments as agreed.

3.4.2 Terms of the Contract

Most of the vendors of automated library systems are original equipment manufacturers (OEM's), meaning that they are licensed by a hardware manufacturer to sell hardware as part of a complete systems package consisting of hardware made by the manufacturer and software developed by the vendor. The manufacturer usually has developed a standard contract called Standard Terms and Conditions of Sale which cannot be changed by the library; nor, in fact, does it need to be because the manufacturer is not selling its hardware to the library, but to the vendor. The only contract that may be required between the manufacturer and the library is a hardware maintenance agreement.

One vendor in the marketplace (GEAC) manufactures its own hardware and markets it along with its own software, while another vendor (IBM) markets its own hardware along with customer-developed software (DOBIS-LIBIS).

It is not possible to define all the specific terms which should be incorporated into every contract. However, the basic outline of the agreement between the vendor and the library could include the following:

Purpose of the Agreement:

The library agrees to pay for the automated library system and the vendor agrees to install the necessary hardware and software and to provide software maintenance. In addition, the library's Request for Proposal and the vendor's response to the Proposal are deemed to be part of the agreement.

Statement of Work:

The statement of work delineates all tasks to be performed by the vendor for the library, namely:

- Delivery of Equipment: Itemize all parts together with their purchase price.
- Delivery of Software: Itemize application software, operating system software, and any enhancements which are not included in the basic price, together with their purchase price.
- Labels: Cost of patron labels and book labels, if supplied by the vendor.
- Communications Facilities: The library is responsible for ordering telephone lines, modems, and cables. The vendor and the library are to prepare the necessary detailed specifications together.
- Supplies: The library is responsible for ordering magnetic tapes, additional disk packs, and all paper supplies.
- Installation and Site Plan: The vendor is to prepare the computer room specifications. The library is responsible for preparing a computer room to these specifications.
- System Enhancements/Modifications: A description of enhancements/modifications to the basic application software required by the library. Including schedule and cost (if any) for installing the changes.
- Coordination and Implementation Services: A list of the vendor's staff responsible for installing the system, together with an outline of their activities, e.g. training, conversion planning, documentation.

- Training: A description of the training programme and training materials provided by the vendor for the library staff.

- Software Maintenance: An agreement by the vendor to maintain all system software. This section contains a number of important aspects:

  a) A description of the vendor's capability for responding to a maintenance request, including response time for critical and non-critical situations.

  b) The number of times each year a vendor representative will visit the library, including the length of each visit.

  c) A commitment to provide free of charge any new features installed at other libraries.

  d) A commitment to keep documentation up-to-date.

  e) A commitment to provide all necessary documentation and source code should third-party maintenance become necessary.

  f) Duration of the software agreement.

  g) Present maintenance cost and future project cost increases.

  h) Determination of fault when an error is found in the software (this would only apply if the library had changed the software).

  i) A description of the library's options if the vendor fails to maintain the software.

  j) The cost to the library of software maintenance, including telephone and travel costs, as required.

- Acceptance Test Plans: A description of the milestones. These may vary from library to library. For example, they could include hardware acceptance, modifications to the software, implementation in one library location, and implementation in several branches. Detailed acceptance criteria must be established, describing the means and the levels for testing reliability and system response times. A statement of the library's options if the acceptance tasks are not completed satisfactorily is also included. Finally, the agreement includes a procedure for logging, evaluating, and correcting system failures during the acceptance tests.

Principal Milestones:

The progress of implementation is measured by the attainment of a number of principal milestones. For example, these may include:

- hardware acceptance;
- software acceptance;
- final system acceptance.

A description, as well as a definition, of each milestone is included in the agreement. The vendor accepts the hardware from the manufacturer. The vendor installs the software, including all modifications, whereupon the library performs software acceptance testing. Final systems acceptance is performed by the library after the system is operating successfully in possibly the Main library and at least one or two branches, depending on the size of the library. A schedule of events is also included:

Period of Performance:

This clause contains the start and end dates of the agreement.

Assignment of Agreement:

The vendor cannot sell or assign the agreement to another vendor without the library's consent.

Independence of the Vendor:

The library agrees that the vendor is an independent contractor and that neither the manufacturer nor other suppliers not party to the agreement, are liable for any obligation of the vendor.

The Vendor is an OEM of the Manufacturer: (if applicable)

The library acknowledges that the vendor is an OEM of the mnufacturer and as such shall receive certain discounts from the manufacturer.

Purchase of Additional Hardware:

The library has the right to buy hardware from suppliers other than the vendor, provided that the equipment is compatible and will be maintained by the same manufacturer or by a vendor approved service.

Vendor's Right of Access to the System:

The library allows the vendor access to the computer system to take any corrective action necessary and to demonstrate the system to prospective customers, provided that confidentiality and data security are preserved.

License to Use the Vendor's Software:

The library has the right to use the vendor's software on one central processing unit only. The library can not duplicate or sell the software.

Changes:

The library and the vendor may mutually make changes to the agreement and negotiate equitable adjustment to price and schedule, where necessary.

Acceptance Testing:

This paragraph describes when the acceptance tests are to be performed and who are to be the participants. The acceptance test plan is defined in the Statement of Work.

Warranty:

The vendor warrants the software to be free from defects, as outlined in the Statement of Work (Software Maintenance), for a period of twelve months from the date of hardware acceptance.

Excusable Delays:

The vendor is not liable for default or damages caused as a result of acts of God, laws of government, war, strikes, etc.

Notice of Delays:

The vendor is to provide the library with written notice within a specified number of working days if the timely performance of the agreement cannot be attained at any point during the system implementation.

Performance Bond:

The vendor furnishes the library with a performance bond equal to the total price of the agreement (or a negotiated percentage). The library agrees not to draw any amount under the bond unless directed by a court decision.

Liquidated Damages:

For each day beyond the scheduled final acceptance date plus thirty days, except when these have been "excusable delays", the vendor pays the library a certain amount per day up to a fixed maximum.

Preparation of Site:

The library prepares the site for the computer installation at its own expense, providing all necessary facilities according to the installation plan provided by the vendor.

Facilities:

The library is to provide the vendor with work space for the vendor's staff while working on-site.

Proprietary Rights:

The library recognizes the proprietary rights of the vendor to the applications software and to respect the confidentiality of the information.

Governing Law:

The laws of the Province of Ontario govern this agreement.

Waivers:

The failure of the parties to enforce the provisions of their agreement is not to be construed to be a waiver of the provisions and does not effect the validity of the agreement.

Taxes, Freight and In-Transit Insurance:

The library is to pay all federal, provincial and municipal taxes, as well as freight charges and in-transit insurance.

Payments:

The library agrees to pay the various amounts for hardware and software. The price is paid at various stages of the work done according to the payment schedule. Payments may follow a plan similar to the following:

- signing of the contract with the vendor;
- completion of hardware acceptance;
- completion of software acceptance;
- completion of final system acceptance.

Indemnifications:

Each party agrees to indemnify and hold the other party harmless from the claims of third persons due to negligent acts of its employees. In addition, the vendor is to pay any existing or future assessment required by the Workman's Compensation Board.

Documentation:

The vendor is to furnish all systems documentation necessary to operate the system.

Disputes and Arbitration:

Both parties should attempt to resolve disputes through mutual negotiation. In the event that no settlement can be reached, each party nominates an arbitrator and the two arbitrators nominate the third arbitrator and the decision of the Arbitration Board will be accepted by both parties.

Limitation of Liability:

Neither party is liable for special or consequential damages arising out of any breach of the agreement.

Ideally, the contract is a document which can be put away, and which hopefully will never be used. However, the relationship may not always stay as amicable as it is at the outset. In this eventuality, it is highly desirable to have a document which details specifically the terms of reference of the agreement.

CHAPTER FOUR

IMPLEMENTATION

4. IMPLEMENTATION

This chapter outlines the fourth phase in the automation process, the implementation of the automated system. Your library has moved from an initial needs assessment for automation through determining the viability of a project in a formal feasibility study, through the actual selection and purchase of a system to meet its needs to the practical exercise of putting up the system. The library will be performing a number of vital tasks during this implementation. Some are discrete tasks performed at only one point; others carry through over a long period of time. Major tasks include the following:

- Site preparation.
- Communication line installation.
- Development of policy parameters.
- Systems acceptance testing.
- Conversion of data from the manual to the automated system.
- Training of staff.
- Public relations.

Following a period of operating the system, a post-implementation review is performed to evaluate the success of the project.

4.1 Management

Management of the implementation process is critical, since a number of people and activities must be coordinated in order to ensure that the system gets up and running. The library will likely have had a project team during the feasibility study and the selection process who were responsible to management for the day to day activities of the project. These people will continue to be involved at the implementation stage. If a project manager was not previously assigned, one should be appointed at this juncture. At noted previously, the project manager may be one of your own staff or someone contracted from the outside who is familiar with the implementation of library automation projects. The project manager's areas of responsibility at the implementation stage include the following:

- Supervision of the library's share of the system implementation plan as negotiated in the contract with the selected vendor. This includes determining the required resources in terms of personnel to perform all the necessary tasks, assigning people to the required tasks, evaluating progress, identifying problems, developing solutions and rescheduling the process in conjunction with the vendor, as necessary.

- Liaison with all vendors, as the official library contact, during system implementation. Vendors will include not only the selected library automation vendor, but also contractors

involved in site preparation, the telephone company for the installation of communications lines, and so on. The project manager monitors vendor activity as required under the contract. If any problems arise, the project manager and the vendor(s) together attempt to rectify them.

- Communication of on-going progress on system implementation to the library management, the board and other interested parties.

- Preparation of general staff and users for the advent of the automated system.

4.2 Implementing the System

Implementation of an automated system will involve a number of tasks. The most important of these are discussed in some detail below.

4.2.1 Site Preparation

The selected vendor will have indicated to the library certain specifications for a computer room. The library is expected to secure construction costs from local contractor(s) and to enter into an agreement to have the work performed before the computer equipment is delivered. Preparation required for a computer room and associated costs may differ significantly, depending on the requirements of the computer system chosen. However, most minicomputer-based library systems require that some attention be given to the following:

- Environmental requirements;

- Electrical requirements;

- Fire protection;

- Security.

Environmental Requirements:

Airconditioning, controlled temperature and humidity, uninterrupted power, cabling and anti-static flooring are all important, as is security protection. Raised flooring is beneficial in that it hides cables, but is probably not necessary. Most library building floors will sustain the weight of a computer system, but it would be worthwhile checking. The amount of static build-up depends on the floor composition and the type of shoes worn by staff, as well as the relative humidity of the air. The combination of static elecricity and air-borne dust is particularly detrimental to magnetic tapes and disks. An ideal environment has an air distribution system which provides cool, well-filtered, humidified air with air pressure kept higher than the pressure of adjacent areas to prevent dust infiltration. All windows and doors should be made weather tight. Operating temperatures for computer systems range from 18° to 24°C with relative humidity 40% - 60%. The key is that fluctuations

within these specifications be kept to a minimum.

Electrical Requirements:

Voltage spikes and drops can cause loss of data, as well as physical damage to electronic components. To prevent this, it is advisable to install an uninterruptable power supply and any other equipment recommended by the manufacturer.

Fire Protection:

Since computer equipment draws large amounts of power, it can be a potentially serious fire hazard. Carbon dioxide or Halon 1301 gas extinguishing systems are generally recommended as superior alternatives for computer room protection. Carbon dioxide works by reducing the oxygen content of the air to the point that it will no longer support combustion. Halon chemicals function by interrupting the combustion process itself. Any extinguishing system must also include a fire detection system.

Security:

Equipment can be insured; however, data cannot. Special safeguards should be taken to protect vital data which may be impossible or very expensive to re-create. Duplicate copies of vital data should be stored away from the computer site, preferably in a fire-proof vault. A regular program for updating the duplicate data is necessary to maintain the value of back-up storage.

The library may well be advised to protect its computer room against theft or vandalism. Protection can run from devises as simple as high-security locks to closed-circuit TV. Other security systems include badge identification devices, wall signs, and visual employee checks.

Software should have security built into it. Data should be protected from unauthorized access. Staff should have access to only those computer functions with which they are required to deal with in their working day. This is achieved through passwording and/or restricting certain terminals to certain functions.

4.2.2 Communication Line Installation

The installation of appropriate communications lines could be considered as part of site preparation. The selected vendor will have indicated certain specifications vis a vis lines and associated equipment necessary to link local and remote terminals to the computer. The library will have asked the local telephone company to provide monthly rental costs for external lines and other equipment, as appropriate, as well as installation costs.

During contract negotiations, the library and the selected vendor will have agreed when communication lines should be installed between the central computer site and branches. Given the above, the library should allow the necessary lead-time to enable the telephone company to install the lines. If there are several phone companies

involved, as may be the case in some parts of Ontario, try to arrange that one company coordinates all the necessary work.

4.2.3 Development of Policy Parameters

Before the vendor installs the system, the library will be asked to fill in a number of forms defining the policies of the library in a format which the computer system will be able to interpret. The content of these tables are specific to your library, and when input to the computer, will enable the vendor's software to operate as if it were specifically written for you.

Some of the tables will be straightforward, such as lists of branch names or the wording of the messages which the library wishes to appear on the various notices. Others will be quite complex and may require a significant amount of thought and time to work through, in order to determine material categories, patron categories, loan policies, fine amounts, renewal limits, reserve policies, etc. The vendor will have staff available to help library staff with this exercise and to do the initial entry of the information into the computer.

4.2.4 Systems Acceptance Testing

Testing of a computer system requires a schedule. The acceptance test schedule should be already defined in the contract signed with the vendor. Without this, the library has no legal basis on which to accept or reject the system.

System Acceptance Testing consists of several phases and the total testing process could last days, weeks, or months. For the most part, the phases are consecutive, consisting of:

- Hardware Acceptance;
- Software Acceptance;
- Reliability Testing;
- Response Time Testing.

Hardware Acceptance:

Hardware acceptance consists of ensuring that all the components of the computer system have been received and that each piece of equipment is working properly. It is a relatively straightforward procedure to take inventory: one simply compares the equipment list in the contract to the pieces of hardware delivered, being on the look-out for substitution of one model for another. There is no need for the library to ensure that equipment is working properly, since technical acceptance of the hardware is the vendor's responsibility. If the equipment is defective, it will fail the upcoming reliability test. In addition, it is standard practice for a reputable computer manufacturer to test its equipment once it is installed on the customer's premises. The manufacturer has not only its reputation to protect, but will have to live up to the terms of the warranty.

Software Acceptance:

Before software acceptance can take place, the vendor must install the computer programmes and make all revisions and enhancements as specified by the library in the contract. This is a process which may take weeks or months, depending on the extent of the changes agreed to.

To test the system, the library will walk through all the functions with the vendor, probably seated in front of a terminal, using the specifications stated in the RFP, together with any modifications mutually agreed to by the vendor and library in the contract. A procedure must be set up whereby each function is either accepted without reservation, or accepted with modifications, or rejected. If there is disagreement, it will almost certainly be because there is no detailed documentation of the requirement, and compromise on both sides will be necessary. It is most unlikely that the Software Acceptance Test will be satisfactory the first time through, unless an informal walk through of the system has taken place earlier to identify the areas of agreement and disagreement. If a second acceptance test is necessary, it is imperative to walk through all the functions and not just those that did not work last time. It is common enough for a modification to one part of a computer programme to cause difficulties in another part.

When software acceptance is completed satisfactorily, the library should not assume that the software will always continue to work. There could be circumstances under which a particular combination of events may be activated and cause a problem in the system. It is not practical to test all combinations.

Reliability Testing:

Reliability testing encompasses testing of the whole system, both hardware and software. The difficulty with reliability testing is to arrive at the means of measuring it. For example, it is less critical if the checkout function is not working at one terminal than if it is not working at all. Because the testing takes place over a considerable period of time, say thirty days, many staff will be involved; thus, a good deal of discipline and organization is required.

It will be very helpful to read other RFPs and contracts to see how other libraries have dealt with the question of reliability. One public library decided upon the following method: the relative importance of each software function and piece of hardware to the total operation of the library was determined and a coefficient was assigned to each. For example, 1.0 was assigned to checkout and 0.1 to each terminal. Careful records were kept of down-time, from the time the vendor was notified until the problem was corrected. At the end of the test period, the numbers of hours that either the function or the piece of hardware was not working properly was multiplied by the coefficient and divided by total operational hours to arrive at the system down-time. A 98% overall reliability factor over the ninety day period was the objective. If it became clear during the reliability testing that the 98% reliability was not going to be met, the vendor would have the opportunity to re-start the process. How many re-starts is up to the library, but two should be sufficient, after which

the library may want to resort to the options for non-compliance in the contract.

Response Time Testing:

System response time is crucial to the success of the project. Five seconds may not sound very long, but one can imagine the irritation of both staff and patrons if it takes five seconds to check out each book. On the other hand, five seconds to do a subject search could be considered very reasonable. The library should establish maximum and ideal response times for each function in the contract. The critical library functions should always be completed within the maximum response time. For non-critical functions one could qualify maximum response times by allowing that it need only be met 95% of the time.

There must be agreement between the vendor and the library as to how the response time test is initiated, and over what time period it will be measured.

There are two principal ways to carry out response time testing: manually or by computer. The latter involves using the system-produced transaction log which contains all incoming and outgoing transactions and attempt a statistical analysis. This could be expensive, since a programme would have to be written to do the analysis and would only be possible if the transaction log contained the appropriate information.

Response time testing the manual way will require human observation and perhaps a stop watch; one can expect a certain amount of inexactness, especially if some of the timings involve fractions of a second. There are at least two ways to handle the response time testing process. The first method involves using time in simulation as follows:

The contract should have stated what mix of functions will be present, meaning the ratio of one function to another. For example, a typical circulation system may have a ratio of four check-outs and four check-ins to one inquiry. At hourly intervals every day for two weeks ask some or all of the staff to interrupt their work for a couple of minutes to do four check-outs, four check-ins and one inquiry chosen at random from a prepared list. Fill in a score sheet for all transactions which exceed the contractual limits.

The second method is to monitor and clock transactions as they are being processed. The library would have to determine how long it would need to do this in order to obtain a viable sample.

Payments to the vendor should be based on the successful completion of these acceptance phases. This will ensure that the vendor retains some incentive to complete the project to the library's satisfaction.

4.2.5 Data Conversion

Throughout the automation process, the library has been concerned with strategies and costs for converting its bibliographic and patron

data into machine-readable form. It may have elected to create a bibliographic database in advance of system implementation or to build the files once the computer has arrived on site.

During contract negotiations, the library and the vendor will have determined when library data should be available for purposes of testing the system and moving to full operation. As part of the contract, the vendor may have been required to convert the library's bibliographic data, if it already exists in machine-readable form elsewhere, to a format compatible with the vendor's system. Given this situation, the library project manager will probably be required to coordinate the relationship between the vendor and any third party, for example, a bibliographic utility or a municipal data processing department.

It is essential that data conversion, whether the data is simply keyed from manual files or obtained from elsewhere, takes place within a well planned, logical framework, in order that system implementation can proceed on schedule to both the library's and the vendor's satisfaction. Both parties are concerned that the automated system be up and running, in the shortest time possible, with a minimum of problems encountered along the way.

Depending on the strategy used for building the bibliographic database, machine-readable labels must be affixed to each bibliographic item. In some cases, a randomly-numbered label is affixed to each item and then linked to the appropriate machine-readable record. With other systems, the appropriate labels are produced from the database and then matched and affixed to the items, in a sense by-passing the linking process as a separate step.

4.2.6 Staff Training

Orientation and training in the use of the automated system is an essential part of the implementation process. In the Request for Proposal, the library will have asked vendors to indicate the extent and content of their training programmes. During contract negotiation, the library and the selected vendor will have reached agreement as to the specifics of training to be provided by the vendor.

Most vendors will provide several levels of training. General overview sessions may be provided for the board and management, as well as for general staff. Specific training sessions will be held, either on-site or off-site, for key personnel who are going to operate the system, as, for example, the people who will be responsible for the day-to-day operation of the computer. Training will also be provided, often over several sessions, for those who will use the system. For example, technical services people will be required to learn how to enter data into the system; public services people will learn how to operate the circulation terminals. A common vendor strategy is to train several people, who in turn are responsible for training the rest of the staff. Training will occur throughout the implementation process from the time the equipment first arrives until the system is fully operational throughout the library. It is important that staff training be scheduled in such a manner that

practical use follows the training sessions, in order to provide reinforcement of what was learned.

Vendors provide a number of guides for use in training and operation of the system. These may include a computer operator's guide, a terminal operator's guide for various functions, etc. Your library may also prepare specific manuals for staff to refer to on a daily basis pertinent to the library's specific use of the system.

4.2.7 Public Relations

Public relations is an important part of implementing an automated system. It is essential that library users be informed as to what the automated system is, what it will do and how it will affect them: the usual public relations tools can be used in this process incuding signs in the library, newsletters, press releases and radio or television announcements. It is also incumbent upon the library to keep municipal authorities and board members informed since these are the people who authorized the project and will be interested in its progress.

There is another level of user interface that is not covered in the above general public relations. If the automated system affects how the user accesses collections in the library, staff must be prepared to spend a good deal of time assisting the user with the new technology. For example, if the library replaces card catalogues with either microform or on-line catalogues, the public must be shown how to use the new equipment.

4.3 Post-Implementation Review

The final stage in the development and implementation of a computer system is often forgotten or ignored. The post-implementation review is, however, an important step and could well make the difference between a successful or less than successful implementation.

The results of the post-implementation review identify how well the project has met its objectives. Timing is important. It must be late enough to ensure that all project costs have been recorded, that the on-going operational costs are known, and that problems which are not likely to occur in the initial stages have had time to surface. The review must be early enough to enable correction of any major problems before costs have soared and to ensure that some project staff are still available to participate in the review and to take corrective action. By its very nature, the review is an activity which ideally is separate from the original project, even though resources and costs required for its completion should have been included in project plans.

The review should cover the following topics:

- Evaluation of project team performance, particularly with respect to the accuracy of system cost estimates and project timetables.

- Evaluation of the operational performance of the system. Is it doing the right things at the expected cost, as outlined in the user requirements section of the RFP and in the contract?

- Evaluation of documentation. This includes documentation required by staff to interact with the system and, if the system has been purchased, the arrangements to acquire the rights to the programming documentation in the event that third party maintenance be required if in future the vendor cannot support the system. The need for good documentation cannot be overemphasized.

- Determination as to whether the objectives and benefits as projected in the feasibility study have been achieved.

- Identification of problem areas and recommendations for correction. Problem areas may include organizational or procedural practices which need fine tuning, or corrections to the computer software may be required.

APPENDIX

APPENDIX

SOURCES FOR ASSISTANCE FOR ONTARIO PUBLIC LIBRARIES

- Library Literature
  Index to Library and Information Science
  H.W. Wilson Company
  New York

  This is a major access point to literature dealing with library automation. Current monographs and periodical articles are listed monthly and cumulated annually.

- Municipal Data Processing Departments

  Many municipalities maintain departments who are responsible for municipal data processing activities. Staff in these departments have considerable computer expertise and could be of assistance to libraries as consultants in various stages of the automation process. Library management might also wish to have this type of municipal representation on a steering or advisory committee which could provide general direction to the library automation project.

- Municipal Information Section
  Municipal Management Policy Branch
  Ministry of Municipal Affairs and Housing
  777 Bay Street, 11th Floor
  Toronto, Ontario
  M5G 2E5

  416-585-7224

  The Municipal Information Section provides assistance to Ontario municipalities as follows:

  - Consulting to municipalities on the applications of computer technology
  - Various publications associated with the automation process
  - Seminars as appropriate to various municipalities
  - Acts as a clearinghouse for technical and other information for municipal data processing

  Libraries can access the expertise in this Ministry through their municipal data processing departments and the field offices of the Ministry of Municipal Affairs and Housing.

- Ontario Regional Library Services

  Eight regional library systems have been established in Ontario. These regions along with the Metropolitan Toronto Library Board should be considered as sources of assistance for library automation. Some of these regions offer consulting services for library automation projects. Others maintain collections of library literature which would be of assistance to libraries embarking on the automation process.

- Technical Services Unit
  Libraries and Community Information Branch
  Ministry of Citizenship and Culture
  77 Bloor Street West, 5th Floor
  Toronto, Ontario
  M7A 2R9

  416-965-2696

  The Technical Services Unit of this Branch provides on-going assistance to libraries as follows:

  - Consulting to local libraries for library automation
  - Various guides and studies associated with library automation
  - Documentation as available on the automation process such as sample Requests For Information and Requests For Proposal
  - Seminars on Library automation to local municipalities and other interested parties
  - Acts as a clearinghouse for automation information

- Other Sources

  Other sources for assistance are noted as follows:

  - A number of public libraries in Ontario have already installed or are in the process of installing automated systems. Professional colleagues at these institutions are often willing to share their experience.

  - The library associations in North America such as OLA, CLA and ALA are a worthwhile source of assistance. At conferences, information can be gathered in the structured enviroment of a workshop or by exchanging information with colleagues in an informal way. Special materials dealing with library automation are often published by these organizations and information is also available through their regular journals and newsletters.

  - Professional schools of library and information science offer assistance through continuing education courses and also provide access to literature on the library automation process.

  - Vendors who market library automated systems are willing to offer demonstrations of their systems and services and to provide brochures and other documentation.

  - A number of independant consultants are also available for assistance in library automation.